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AN INTEGRATED APPROACH TO DEVELOPING STRATEGIES FOR IMPROVING THE FINANCIAL COMPETITIVENESS OF SASK PORK PRODUCERS

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An Integrated Approach to Developing Strategies For Improving The Financial Competitiveness of Saskatchewan Pork Producers

ADF Project #20030620

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Table of Contents

Acknowledgements 1

Table of Contents 2

List of Tables 3

Summary 4

Objective 4

Methodology 5

Results and Discussion 6

Conclusions 19

Implications 21

References 22

Appendix I -Assumptions 24

Appendix II -Prairie Swine Centre Research Project Economic Analysis 36

Appendix III -Prairie Swine Centre Phase Feeding Analysis 120

Appendix IV –Enterprise Returns Module for Different Facility Sizes 165

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List of Tables

Table 1. Assumed production parameters for various sizes of pork production facilities 6

Table 2. Assumed base-line economic indicators for various sizes of pork production facilities ($ per hog marketed) 7

Table 3. Prairie Swine Centre based projects analyzed for economic impact 8

Table 4. Economic Return and Percent Change in Net Earnings from Default for Selected Prairie Swine Centre Research Projects 10

Table 5. Change in Return on Assets and Percent Change in Return on Assets from Default Farm for Selected Prairie Swine Centre Research Projects 12

Table 6. Marginal Increase in Net Income/hog Marketed under 4 Different Grower-Finisher Phase Feeding Programs 14

Table 7. Ease of adoption for various Prairie Swine Centre research projects 16

Table 8. Assumed percent implementation of Research by the Saskatchewan Pork Industry based on ease of adoption 17

Table 9. Financial Benefit to the Saskatchewan Pork Industry from Research 18

Table 10. Total Annual Research Contribution to the Saskatchewan Pork Industry based on Ease of Adoption 19

Table 11. Multiplier Effect of ADF annual operating grant. 19

Table 12. Ranking of Economic Return and Ease of Adoption from selected Prairie Swine Centre Research Projects 20

Table 13. Ranking of Ease of Adoption and Economic Returns from selected Prairie Swine Centre Research Projects 21

■ Summary

Saskatchewan pork producers find themselves in an area of natural advantage, relatively inexpensive feed grains and an abundant land base. This contributes to Saskatchewan being one of the low-cost pork producers in the world. Due to the global nature of the pork industry, financial competitiveness will always be an essential component of success. Producers who successfully identify and implement new technologies and management strategies create a competitive advantage by reducing cost of production or increasing revenue generated. However, adoption of new technology may be slowed by perceived financial risk and reward. This project speaks directly to pork producers, addressing adoption of new technologies based on sound science and financial analysis.

All experiments completed by Prairie Swine Centre over the last 6 years (1999-2004) were exposed to detailed financial analysis, concluding with the net benefit accrued to specific research projects. These projects were then prioritized in terms of net benefit per hog marketed, ease of adoption, and total contribution to Saskatchewan's pork industry.

Throughout the period of 1999-2004 specific research projects generated a range in individual net benefit to the Saskatchewan pork industry of $0.11 to $8.84 per hog marketed (Project 02-02 Reducing Water Wastage from Nipple Drinkers by Grower-Finisher Pig, Project 04-01 Response of Growing and Finishing Pigs to Dietary Energy Concentration). In addition 25% of the research projects generated a net benefit of at least $2.00 per hog marketed, while an additional 25% generated a return in excess of $1.00 per hog marketed. Total net benefit of Prairie Swine Centre research over this time period is approximately $38 million annually (see Table 8, Table 9).

In order to speed the rate of technology adoption, individual research projects were ranked according to their ease of adoption. If pork producers would incorporate only the research projects classified as EASY (see Table12, Table 13), they would realize a net benefit in excess of $12 per hog marketed. Combining per market hog net returns of the Easy ($12.63/pig), Moderate ($12.69/pig), and Difficult ($8.21/pig) categories there is a potential to increase returns in excess of $33 per hog marketed.

The improvements from Prairie Swine Centre research over the 1999-2004 period contributes approximately $38 million annually to the Saskatchewan pork industry. Pork producers benefit through a increased competitive advantage in the global environment by becoming more cost competitive. The Government of Saskatchewan benefits by achieving a substantial return on research investment, a minimum of $25 for each dollar invested at Prairie Swine Centre.

■ Objective

The objective of this project is to develop a detailed document that can be used by the province's pork producers to identify ways in which they can maximize revenues and minimize expenses. The document clearly identifies specific actions in detail, such that pork producers can easily 1) Identify those that can be applied on their farm (size and scope of farm dependant), 2) Prioritize actions in terms of ease of application and cost of adoption, and 3) implement them in a strategic way to enhance financial competitiveness of their operation.

■ Methodology

All of the experiments conducted by Prairie Swine Centre over the past 6 years (1999-2004) were subjected to a detailed financial analysis, to determine the cost of implementation and the economic value that would accrue to a commercial pig farm following adoption of these results. These results have been previously broadly circulated to the industry, it is recognized that the final decision to implement a new management strategy or technology will be dependant on the perceived economic impact on individual farms. Although Prairie Swine Centre attempts to define the economic impact of its research, the detailed financial analysis of this project goes far beyond that which can normally be carried out at the conclusion of a research project.

To complete this project it was necessary to build a financial model capable of considering detailed changes in expenses and revenues. In addition, reflecting the diverse nature of Saskatchewan pork farms, the model needed to be able to describe how individual research projects would impact operations of different size and scope. Size analysis covers the range of practical farms including 300, 600, 1200, 2500, and 5,000 sows farrow-to-finish. All analyses were conducted on farms that covered the full scope of production activities from farrow-to-finish.

PSC enlisted the assistance of the George Morris Centre (Canada's only Independent Agri-Food Think Tank) to assist in developing financial models. This independent group provided a broad economic approach to understanding farm financial interrelationships.

The analysis had to be capable of reflecting real farm conditions such as changes to shipping strategies including pig weight, range of carcass composition, and application to one or more grading grids as was currently available from commercial packers servicing the Saskatchewan market. On the cost side, the analysis needed to provide a robust review of the changing conditions such as feed price variation over time and the effect that would have on returns for adoption of new technology.

The resulting financial model finally had to consider a range of operating variables, including changes to variable costs (example, feed) through to the increases in capital purchases necessary to implement new research (example the adoption of low energy diets). To allow the comparison across time and over as many operation sizes as possible, certain assumptions were made. These are detailed in Appendix I-Assumptions. Where possible the same assumptions applied to all analyses, where this is not the case a notation identifies additional assumptions made in the analysis of each project. By applying a consistent set of assumptions the analysis provides an excellent opportunity to rank the various projects by several different criteria. These include ranking in order of on-farm financial benefit from highest to lowest; ranking for ease of implementation based on lowest cost to implementation being the highest ranking.

Results of the analysis are presented in actual dollars, as well as relative to the baseline (default) farm. The default farm represents the standard cost and revenue structure of that size of farm enterprise. Each research project then is applied to that default farm, with changes to costs and revenues as dictated by the changing animal performance, cost structure or change to shipping strategy resulting in a new cost and revenue position for the farm.

Financial Results of each analysis are presented using three financial statements generated by the model: Income Statement, Statement of Cash Flows, and the Balance Sheet. Using the changes in these three statements before and after applying the research results provided the level of detail required to assess the full impact of a change on the farm. These financial results (example: changes in feed costs, change in revenues, changes in net income) are then analyzed to determine key financial ratios of importance to pork producers. For example feed cost per market pig shipped, and net income per market pig shipped. The resulting Enterprise Model was central to the development of this project, and this prototype will form the basis of future enterprise analysis.

■ Results and Discussion

The results of economic analysis of applied research can be found summarized in Tables 1 through 6. This analysis includes the potential impact of research on individual farm enterprises. In addition, the combined impact of applying this research across Saskatchewan's pork industry has also been assessed to develop a better understanding of the impact of research on the provincial economy (Tables 7-13).

Table 1. Assumed production parameters for various sizes of pork production facilities

Category	300 Sow	600 Sow	1.200 Sow	2.500 Sow	5.000 Sow
Breeding Herd					
Litters/Sow/Year	2.40	2.40	2.40	2.40	2.40
Farrowing Rate	90%	90%	90%	90%	90%
Culling Rate – Sows	40%	40%	40%	40%	40%
Replacement Gilts – Cost	$400	$400	$390	$380	$370
Gilts in pool	5	10	20	40	80
Pigs Born Alive/Litter	11.2	11.2	11.2	11.2	11.2
Pre-Weaning Mortality	10%	10%	10%	10%	10%
Pigs Weaned/Sow/Year	24.2	24.2	24.2	24.2	24.2
Nursery					
Mortality Rate	2%	2%	2%	2%	2%
Production Cycle (weeks)	7.5	7.5	7.5	7.5	7.5
Grower-Finisher					
Mortality Rate	2%	2%	2%	2%	2%
Production Cycle (weeks)	14	14	14	14	14

Tables 1 and 2 outline the assumptions made in describing the typical farm enterprise. These 'default' farms form the basis of our analysis and have been described in terms of their production parameters (Table 1). These production parameters are used to develop the economic base-line indicators found in Table 2. It should be noted that every attempt has been made to use actual 'typical' performance and financial data where available. Other enterprise studies have shown as much variation in productivity and financial performance within a herd over time as there is between herds of different sizes. As a result, most productivity indicators have been held constant across herd size. For example, litters per sow per year are assumed constant across enterprise size, reflecting typical biological performance of modern genetics under good management.

Larger herds (1,200, 2,500, and 5,000) are assumed to have improved buying power in specific areas such as replacement breeding stock, and in addition employ 100% artificial insemination in place of a natural breeding program. Key productivity indicators, including pigs/sow per year, nursery and finisher pig performance (mortality, weeks of production, ADG) is assumed equal across farm enterprise size. This assumption is valid based on the premise that all enterprise sizes have equal access to the same management skills, commercial breeding stock, and diet formulation. A complete list of herd productivity and financial indicators can be found in Appendix I – Assumptions.

Table 2. Assumed base-line economic indicators for various sizes of pork production facilities ($ per hog marketed)

Category	300 Sow	600 Sow	1,200 Sow	2,500 Sow	5,000 Sow
Market Hog Revenue	148.04	148.04	148.04	148.04	148.04
Total Revenue	152.44	152.39	152.37	152.36	152.36
Total Value of Assets	369.36	359.85	349.78	341.86	335.01
Average Feed Cost	58.15	57.92	57.85	57.81	57.80
Total Miscellaneous Costs	30.18	29.29	28.81	28.48	28.23
Labour	5.94	5.94	5.94	5.94	5.94
Water/Manure Handling	3.57	3.54	3.53	3.53	3.53
Total Fixed Costs	54.29	51.68	48.40	46.41	45.05
Net Earnings	**(1.42)**	**2.30**	**6.13**	**8.49**	**10.12**

Economic indicators used to assess financial performance of a commercial farrow-to-finish operation can be found in Table 2. Net earnings for each farm size reflect differences based on economies-of-scale associated with larger pork production facilities. Capital cost is assessed relative to the most common enterprise in the province (600 sow farrow-finish). It is assumed a 300 sow enterprise will have capital costs 2.5% greater on a per sow place basis, where a 1,200 sow enterprise will have capital costs 2.5% lower than the 600 sow enterprise. The 2,500 sow and 5,000 sow enterprise have capital cost 5% and 7.5% per sow place lower than our 600 sow enterprise. This difference impacts the financial carrying costs and total overhead per hog marketed. Table 2 reflects these differences by reporting a spread in net earnings ranging from a loss of $1.42 per pig marketed to a gain of $10.12 per hog marketed. It should be noted that the absolute profitability of each farm size is not indicative of the profitability of any one farm in Saskatchewan. The relative difference between farm sizes is important as it reflects the net earnings potential difference between farm sizes under a given set of circumstances as described above and in the Appendix I-Assumptions.

Table 3. Prairie Swine Centre based projects analyzed for economic impact

Project Number	Research Project	Lead Author
	2004	
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	John Patience
04-02	Crowding Reduces Performance of Weanling Pigs	John Patience
	2003	
03-01	Soluable and Insoluable Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake on Grower Pigs	Augustine Owusu-Asiedu
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	Denise Beaulieu
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal	Ruurd Zijlstra
03-04	Electronic Sow Feeder: A Preliminary Report	Yuzhi Li
	2002	
02-01	Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders	Shala Christianson
02-02	Reducing Water Waste from Nipple Drinkers by Grower-Finisher Pigs	Yuzhi Li
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	Ruurd Zijlstra
02-04	Effects of Large Group Size on Productivity of Grower-Finisher Pigs	Thusith Samarakone
02-05	Effect of Dietary Crude Protein and Phase Feeding on Performance of Urinary Nitrogen Excretion of Grower Pigs	Nicole Rodgers
	2001	
01-01	The Impact of Feeder Adjustment and Group Size/Density on Weanling Pig Performance	Laura Smith
01-02	Response to Dietary Energy Concentration and Stocking Density in Weaned Pigs	Crystal Levesque
01-03	Effect of Gender and Crowding on Variation in Days to Market	Dana Cooper
01-04	The Effect of Ergot on the Performance of Weanlings	Temitope Oresanya
01-05	Effects of Nipple Drinker Height and Flow Rate on Water Wastage in Grower and Finisher Pigs	Yuzhi Li
01-06	Nutritional Value of High-Oil Oat Groats	Ruurd Zijlstra
01-07	Replacement of Soybean Meal with Canola Meal in Weaned Pigs	E. David Ekpe
	2000	
00-01	Effect of Feed Presentation on the Feeding Behaviour of Grower-Finisher Pigs	Kimberly MacDonald
	1999	
99-01	Performance and Carcass Quality of Growing-Finishing Pigs Submitted to Reduced Nocturnal Temperatures	Stephane Lemay
99-02	An Oil Sprinkling System for Dust Control in Pig Buildings	Stephane Lemay
99-03	The DE Content of Hulless Barley	Ruurd Zijlstra

All research projects conducted by Prairie Swine Centre between 1999 - 2004 were analyzed for their potential economic impact on the provincial pork industry. In total 22 projects were selected for this detailed analysis. Table 3 lists research projects chronologically and assigns a reference number. Readers can follow individual projects across the remaining tables to evaluate the economic impact each research project has on different pork production facilities.

Table 4 represents a comprehensive evaluation of each project. This table is developed from the Enterprise Returns Module sheet included with each Research Project in this report. This table summarizes the range, average value, and percent improvement to net income (per hog marketed) for all 22 research projects. Where a research project compared a range of inclusion rates, the median rate was used to develop the average return per market hog.

Percentage improvement refers to the improvement over default, or base-line, profitability for each farm size. Although the average net (income) impact will be an absolute value (example $1.25 per hog marketed), the value of this improvement expressed on a percent basis is greater the lower the net earnings of a particular operation. For example, the value of Project 02-02, Reducing Water Wastage, has an average value of $0.14 per pig marketed. When expressed on a percentage improvement over default net returns, this means that $0.14 is an improvement in net return of 10% on the 300 sow farm, but only 1% on the 5,000 sow enterprise due to the higher default net returns on the larger enterprise.

Average net return per hog marketed on the 22 research projects varies from a low of $0.14 to a high of $6.23. Each research project was evaluated independently, therefore many pork producers could benefit by the adding these results to calculate their farm's benefit from applying a number of research results.

Table 5 uses the same methodology as Table 4 in selecting the average response to treatments in each research project and evaluating the change in Return on Assets (ROA), which is calculated by dividing total net income by total assets. This measure creates a comparison across enterprise size that yields similar results to Table 4 but bases the comparison on the capital investment. There are two key financial ratios that are important to any business. These are, ROI (return on investment), and ROA. In this analysis ROI was not considered a reliable indicator because many research projects required only labour, and little or no capital to implement, thus calculating a ROI on the new investment would not have provided a reasonable assessment of the project's value. ROA provides a good basis for comparing the improvement in performance against the overall enterprise investment.

Analyzing Table 5 we find the projects that generate the greatest financial improvement per hog marketed, also generate the greatest ROA. However, the percent change (from the default scenario) for individual projects is not the same in Table 4 and Table 5 respectively. While the same average benefit is experienced in a 300 sow or a 5,000 sow facility (Project 04-01, $4.92/hog) the capital cost per sow place is higher in a 300 sow facility, therefore percent change in ROA (366%) is greater than the percent change in net earnings (346%).

Table 4. Economic Return and Percent Change in Net Earnings from Default for Selected Prairie Swine Centre Research Projects

Project Number	Research Project	Range in Returns $/Hog Marketed	Average $/Hog Marketed	Percent Change from Default Net Earnings				
	2004			**300**	**600**	**1,200**	**2,500**	**5,000**
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	**$0.60 - $8.84**	**$4.92**	346%	214%	80%	58%	49%
04-02	Crowding Reduces Performance of Weanling Pigs		**$0.88**	62%	38%	14%	10%	9%
	2003							
03-01	Soluable and Insoluable Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake on Grower Pigs	**$1.89 - $2.26**	**$2.08**	146%	90%	34%	24%	21%
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	**$0.31 - $2.61**	**$1.22**	86%	53%	20%	14%	12%
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal		**$1.25**	88%	54%	20%	15%	12%
03-04	Electronic Sow Feeder: A Preliminary Report		**$3.38**	238%	147%	55%	40%	33%
	2002							
02-01	Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders		**$0.70**	49%	30%	11%	8%	7%
02-02	Reducing Water Waste from Nipple Drinkers by Grower-Finisher Pigs	**$0.11 - $0.17**	**$0.14**	10%	6%	2%	2%	1%
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	**$0.72 - $1.44**	**$1.08**	76%	47%	18%	13%	11%
02-04	Effects of Large Group Size on Productivity of Grower-Finisher Pigs*		**$0.38**	27%	17%	6%	4%	4%

02-05	Effect of Dietary Crude Protein and Phase Feeding on Performance of Urinary Nitrogen Excretion of Grower Pigs	**$0.94 - $2.07**	**$1.50**	106%	65%	25%	18%	15%
	2001							
01-01	The Impact of Feeder Adjustment and Group Size/Density on Weanling Pig Performance	**$0.05 - $2.01**	**$0.69**	49%	30%	11%	8%	7%
01-02	Response to Dietary Energy Concentration and Stocking Density in Weaned Pigs	**$0.23 – $0.90**	**$0.47**	33%	20%	8%	5%	5%
01-03	Effect of Gender and Crowding on Variation in Days to Market	**$2.16 - $2.16**	**$2.16**	152%	94%	35%	25%	21%
01-04	The Effect of Ergot on the Performance of Weanlings	**$1.96 - $11.50**	**$6.23**	439%	271%	102%	73%	62%
01-05	Effects of Nipple Drinker Height and Flow Rate on Water Wastage in Grower and Finisher Pigs	**$0.09 - $0.32**	**$0.21**	15%	9%	3%	3%	2%
01-06	Nutritional Value of High-Oil Oat Groats		**$0.70**	49%	30%	11%	8%	7%
01-07	Replacement of Soybean Meal with Canola Meal in Weaned Pigs		**$0.27**	19%	12%	4%	3%	3%
	2000							
00-01	Effect of Feed Presentation on the Feeding Behaviour of Grower-Finisher Pigs		**$2.55**	180%	111%	42%	30%	25%
	1999							
99-01	Performance and Carcass Quality of Growing-Finishing Pigs Submitted to Reduced Nocturnal Temperatures		**$1.03**	73%	45%	17%	12%	10%
99-02	An Oil Sprinkling System for Dust Control in Pig Buildings		**$0.18**	13%	8%	3%	2%	2%
99-03	The DE Content of Hulless Barley		**$1.49**	106%	66%	25%	18%	15%

Table 5. Change in Return on Assets (ROA) and Percent Change in ROA from Default Farm for Selected Prairie Swine Centre Research Projects

Project Number	Research Project	Avg. Change in ROA*	Percent Change from Default Return on Assets				
	2004		**300**	**600**	**1,200**	**2,500**	**5,000**
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	**139.0%**	366%	217%	79%	56%	46%
04-02	Crowding Reduces Performance of Weanling Pigs	**24.0%**	63%	38%	14%	10%	8%
	2003						
03-01	Soluable and Insoluable Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake on Grower Pigs	**76.0%**	200%	119%	43%	31%	25%
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	**24.0%**	63%	38%	14%	10%	8%
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal	**35.0%**	92%	55%	20%	14%	12%
03-04	Electronic Sow Feeder: A Preliminary Report	**93.0%**	245%	145%	53%	38%	31%
	2002						
02-01	Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders	**19.0%**	50%	30%	11%	8%	6%
02-02	Reducing Water Waste from Nipple Drinkers by Grower-Finisher Pigs	**4.0%**	11%	6%	2%	2%	1%
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	**30.0%**	79%	47%	17%	12%	10%
02-04	Effects of Large Group Size on Productivity of Grower-Finisher Pigs*	**10.0%**	26%	16%	6%	4%	3%
02-05	Effect of Dietary Crude Protein and Phase Feeding on Performance of Urinary Nitrogen Excretion of Grower Pigs	**110.0%**	289%	172%	63%	44%	36%
	2001						

Table 5. Change in Return on Assets (ROA) and Percent Change in ROA from Default Farm for Selected Prairie Swine Centre Research Projects

Project Number	Research Project	Avg. Change in ROA*	Percent Change from Default Return on Assets				
	2004		**300**	**600**	**1,200**	**2,500**	**5,000**
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	**139.0%**	366%	217%	79%	56%	46%
04-02	Crowding Reduces Performance of Weanling Pigs	**24.0%**	63%	38%	14%	10%	8%
	2003						
03-01	Soluable and Insoluable Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake on Grower Pigs	**76.0%**	200%	119%	43%	31%	25%
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	**24.0%**	63%	38%	14%	10%	8%
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal	**35.0%**	92%	55%	20%	14%	12%
03-04	Electronic Sow Feeder: A Preliminary Report	**93.0%**	245%	145%	53%	38%	31%
	2002						
02-01	Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders	**19.0%**	50%	30%	11%	8%	6%
02-02	Reducing Water Waste from Nipple Drinkers by Grower-Finisher Pigs	**4.0%**	11%	6%	2%	2%	1%
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	**30.0%**	79%	47%	17%	12%	10%
02-04	Effects of Large Group Size on Productivity of Grower-Finisher Pigs*	**10.0%**	26%	16%	6%	4%	3%
02-05	Effect of Dietary Crude Protein and Phase Feeding on Performance of Urinary Nitrogen Excretion of Grower Pigs	**110.0%**	289%	172%	63%	44%	36%
	2001						

01-01	The Impact of Feeder Adjustment and Group Size/Density on Weanling Pig Performance	**19.0%**	50%	30%	11%	8%	6%
01-02	Response to Dietary Energy Concentration and Stocking Density in Weaned Pigs	**24.0%**	63%	38%	14%	10%	8%
01-03	Effect of Gender and Crowding on Variation in Days to Market	**60.0%**	158%	94%	34%	24%	20%
01-04	The Effect of Ergot on the Performance of Weanlings	**148.0%**	389%	231%	85%	60%	49%
01-05	Effects of Nipple Drinker Height and Flow Rate on Water Wastage in Grower and Finisher Pigs	**8.0%**	21%	13%	5%	3%	3%
01-06	Nutritional Value of High-Oil Oat Groats	**20.0%**	53%	31%	11%	8%	7%
01-07	Replacement of Soybean Meal with Canola Meal in Weaned Pigs	**8.0%**	21%	13%	5%	3%	3%
	2000						
00-01	Effect of Feed Presentation on the Feeding Behaviour of Grower-Finisher Pigs	**78.0%**	205%	122%	45%	31%	26%
	1999						
99-01	Performance and Carcass Quality of Growing-Finishing Pigs Submitted to Reduced Nocturnal Temperatures	**29.0%**	76%	45%	17%	12%	10%
99-02	An Oil Sprinkling System for Dust Control in Pig Buildings	**5.0%**	13%	8%	3%	2%	2%
99-03	The DE Content of Hulless Barley	**4.20%**	111%	66%	24%	17%	14%

* Return on Assets (ROA) is calculated by dividing the total Net Revenue by Total Assets. The Average change in ROA is a calculated arithmetic average for all farm sizes. Percentages reflect percent improvement in ROA for each specific farm size, relative to their default ROA value.

Table 6. Marginal Increase in Net Income/hog Marketed under 4 Different Grower-Finisher Phase Feeding Programs

Project Number	Research Project	3 Phase (300 Sow)	6 Phase (600, 1,200 Sow)	9 Phase (2,500 Sow)	12 Phase (5,000 Sow)
	2004				
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	$9.07	$8.84	$8.76	$7.68
	2003				
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	$0.44	$0.46	$0.47	$0.48
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal	$1.26	$1.25	$1.24	$1.21
	2002				
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	$1.19	$1.08	$1.04	$1.04
	2001				
01-03	Effect of Gender and Crowding on Variation in Days to Market	$2.03	$2.16	$2.26	$2.18
01-04	The Effect of Ergot on the Performance of Weanlings	$5.26	$5.32	$5.34	$5.36
00-02	Effect of Feed Presentation on the Feeding Behaviour of Grower-Finisher Pigs	$2.77	$2.80	$2.81	$2.93
	1999				
99-03	The DE Content of Hulless Barley	$1.65	$1.49	$1.49	$1.45

Table 6 looks at a series of research projects and subjects them to an analysis of the impact of diet by extrapolating them over 4 different phase feeding programs (1 grower / 2 finisher diets, 2 grower / 4 finisher diets, 3 grower / 6 finisher diets, and 4 grower / 8 finisher diets). Again, as in Tables 4 and 5 the results are expressed in net returns per market hog improvement over the respective default enterprise profitability. This analysis provided an opportunity to evaluate a research project under the simplest diet delivery system (3 phases from grower to finisher), versus a typical 6-phase program and even 9 and 12-phase diet systems. We know that as the pig grows, our ability to marginally improve cost of production is linked directly to our ability to provide diets, which do not underfeed or overfeed nutrients at each stage of production. Thus, increasing the number of diets over the lifetime of the pig reduces costs.

As can be noted from Table 6, feed research returns a consistent and high net return for the producer. One of the most recent feed research studies, 04-01 Response to Dietary Energy Concentration, focuses on energy levels in feeds with significant improvements in returns of over $7.68 per pig regardless of the herd size or number of diets used. This further underscores the importance of the cost of dietary energy in feed formulation and enterprise management. It should be noted Table 6 also shows a significant opportunity to improve profitability by increasing the number of diets. As this analysis was conducted with 5-year average grain prices and a fixed point in time diet formulation, the full value of this exercise may be much greater than demonstrated in this table under certain market conditions (such as high grain prices), combined with diet reformulation for current ingredient prices.

Pork producers in Saskatchewan are recognized as innovative, many could be classified as early adopters of new information. With this in mind, the 22 research projects were evaluated for their ease of adoption. Table 7 describes ease of adoption in terms of the time, labour and capital required to implement the new research information on the commercial farm. Three classifications were created: Easy, Moderate and Difficult. We further describe Easy projects as those which require little labour and little or no capital, Moderate as requiring a longer period to implement, but still require little labour or capital. Difficult projects require significant lead time or planning, and is either labour or capital intensive.

Using this three-level description we estimated the extent to which the industry would adopt the research results. **Easy** projects, such as switching between wheat classes for starter diets (Project 02-03), or adjusting water nipples to reduce water wastage (Project 02-02). These "Easy" projects were estimated to be adopted by 80% of the industry. **Moderate** projects such as changing energy levels in the diet (Projects 04-01, Response of Growing-Finishing Pigs to Dietary Energy Concentration, or 01-02, Response to Dietary Energy and Stocking Density in Weaned Pigs), or changing group size in pens (Project 02-04, Effects of large Group Size in Grower-Finisher) require the specialized services of a nutritionist and perhaps pen reconfiguration. These "Moderate" projects were estimated to be adopted by 40% of the industry. There were very few projects deemed to be **Difficult** to adopt, however where novel ingredients like mustard meal were used (project 03-03) this ingredient can be difficult to obtain on a regular basis, or in the case of moving to large group sow housing systems (03-04) this would require extensive barn renovation or rebuilding to adopt this technology. These "Difficult" projects were estimated to be adopted by 10% of the industry.

Table 7. Ease of adoption for various Prairie Swine Centre research projects

Project Number	Research Project	Ease of Adoption*
	2004	
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	Moderate
04-02	Crowding Reduces Performance of Weanling Pigs	Moderate
	2003	
03-01	Soluable and Insoluable Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake on Grower Pigs	Difficult
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	Moderate
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal	Difficult
03-04	Electronic Sow Feeder: A Preliminary Report	Difficult
	2002	
02-01	Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders	Easy
02-02	Reducing Water Waste from Nipple Drinkers by Grower-Finisher Pigs	Easy
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	Easy
02-04	Effects of Large Group Size on Productivity of Grower-Finisher Pigs	Moderate
02-05	Effect of Dietary Crude Protein and Phase Feeding on Performance of Urinary Nitrogen Excretion of Grower Pigs	Difficult
	2001	
01-01	The Impact of Feeder Adjustment and Group Size/Density on Weanling Pig Performance	Easy
01-02	Response to Dietary Energy Concentration and Stocking Density in Weaned Pigs	Moderate
01-03	Effect of Gender and Crowding on Variation in Days to Market	Moderate
01-04	The Effect of Ergot on the Performance of Weanlings	Easy
01-05	Effects of Nipple Drinker Height and Flow Rate on Water Wastage in Grower and Finisher Pigs	Easy
01-06	Nutritional Value of High-Oil Oat Groats	Moderate
00-07	Replacement of Soybean Meal with Canola Meal in Weaned Pigs	Moderate
	2000	
00-01	Effect of Feed Presentation on the Feeding Behaviour of Grower-Finisher Pigs	Easy
	1999	
99-01	Performance and Carcass Quality of Growing-Finishing Pigs Submitted to Reduced Nocturnal Temperatures	Easy
99-02	An Oil Sprinkling System for Dust Control in Pig Buildings	Moderate
99-03	The DE Content of Hulless Barley	Moderate

* Ease of adoption is a subjective measure based on the level of capital and labour required to implement the Research (see Table 8 for a more detailed description).

Table 8. Assumed percent implementation of Research by the Saskatchewan Pork Industry based on ease of adoption

Ease of Adoption	% Implementation
Easy	80%
Moderate	45%
Difficult	10%

Easy:	Implementation within 1-3 months, and little capital and labour is required
Moderate	Implementation within 3-12 months, and little capital or labour is required
Difficult	Implementation greater than one year, and is capital or labour intensive

Table 9 combines the improvement in net revenues over default for the 600-sow farrow to finish system (using average returns provided in Table 4) with the anticipated level of industry adoption (described in Table 8). This analysis provides an estimate of the annual value of Prairie Swine Centre Research to the Saskatchewan pork industry. For example, project # 03-02, Effect of Starter Feeding Regime on Variability in Body Weight and Performance in the Nursery, is adopted on a Moderate basis (by 40% of the industry), and provides a net return benefit of $1.22 per pig marketed, and assuming the annual marketing in Saskatchewan of 2.4 million hogs, the benefit annually to the industry for this one project is $1.174 million.

Table 10 summarizes the value to the industry for the 22 research projects analyzed. Based on the rates of adoption described previously, the annual benefit to the industry is $38 million dollars. Approximately two-thirds of this annual contribution would be either Easy or Moderately Easy for the Saskatchewan pork industry to adopt.

As a Program Funder of Prairie Swine Centre, Saskatchewan Agriculture and Food through the Agricultural Development Fund has traditionally provided support of $250,000 annually in support of the research and technology transfer programs. Table 11 demonstrates the Annual Multiplier Effect of this investment based on the $38 million annual benefit to the industry described above. A very conservative analysis looking at the six years investment leading up to the present day, and assuming a onetime benefit to the industry would lead to a multiplier effect of $25 dollars return to the province for every dollar invested. In reality most production and revenue improvements are realized annually. Assuming the annual benefit accrues each year the annual investment in research at Prairie Swine Centre provides to ADF a multiplier of $153 in industry benefit for every dollar invested.

Table 9. Financial Benefit to the Saskatchewan Pork Industry from Research*

Project Number	Research Project	Total Contribution ($000's)
	2004	
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	$4,723
04-02	Crowding Reduces Performance of Weanling Pigs	$845
	2003	
03-01	Soluable and Insoluable Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake on Grower Pigs	$498
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	$1,174
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal	$300
03-04	Electronic Sow Feeder: A Preliminary Report	$811
	2002	
02-01	Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders	$1,344
02-02	Reducing Water Waste from Nipple Drinkers by Grower-Finisher Pigs	$27[illegible]
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	$2,074
02-04	Effects of Large Group Size on Productivity of Grower-Finisher Pigs	$365
02-05	Effect of Dietary Crude Protein and Phase Feeding on Performance of Urinary Nitrogen Excretion of Grower Pigs	$361
	2001	
01-01	The Impact of Feeder Adjustment and Group Size/Density on Weanling Pig Performance	$1,325
01-02	Response to Dietary Energy Concentration and Stocking Density in Weaned Pigs	$446
01-03	Effect of Gender and Crowding on Variation in Days to Market	$2,074
01-04	The Effect of Ergot on the Performance of Weanlings	$11,962
01-05	Effects of Nipple Drinker Height and Flow Rate on Water Wastage in Grower and Finisher Pigs	$410
01-06	Nutritional Value of High-Oil Oat Groats	$672
01-07	Replacement of Soybean Meal with Canola Meal in Weaned Pigs	$259
	2000	
00-01	Effect of Feed Presentation on the Feeding Behaviour of Grower-Finisher Pigs	$4,896
	1999	
99-01	Performance and Carcass Quality of Growing-Finishing Pigs Submitted to Reduced Nocturnal Temperatures	$1,978
99-02	An Oil Sprinkling System for Dust Control in Pig Buildings	$173
99-03	The DE Content of Hulless Barley	$1,446

*Calculations based on average provincial hog marketings of 2.4 million annually. Level of adoption based on information in Tables 7 and 8.

Table 10. Total Annual Research Contribution to the Saskatchewan Pork Industry based on Ease of Adoption

Ease of Adoption	Total Contribution ($000's)	Percent Contribution
Easy	$24,262	63.2%
Moderate	$12,177	31.7%
Difficult	$1,970	5.1%
Total	**$38,409**	**100%**

*Calculations based on average provincial hog marketings of 2.4 million annually.

Table 11. Multiplier Effect of ADF annual operating grant

Ease of Adoption	Annual Multiplier Effect	1999-2004 Multiplier Effect
Easy	97.0	16.2
Moderate	48.7	8.1
Difficult	7.9	1.3
Total	**153.6**	**25.6**

*Calculations based on average provincial hog marketings of 2.4 million annually. Annual Saskatchewan Agriculture, Food, Rural Revitalization ADF operating grant based on an annual contribution of $250,000.

■ Conclusions

Applied, near-market research conducted by Prairie Swine Centre for the pork industry has and continues to provide significant benefit to individual pork producers as well as to the industry as a whole. This detailed economic analysis provides a new tool for pork producers to evaluate their practices in light of the economic benefits of recent research. Table 12 shows the 22 research projects ranked in order of their impact on net returns from largest to smallest. By comparing their management practices against this table, pork producers can easily evaluate which projects they have yet to adopt. Focusing on those projects that provide the greatest potential value are easily identified. Sometimes the ability to adopt new information is not based solely on the magnitude of the potential benefit.

Table 13 recognizes that there are many pressures on the modern pork producer such as time, labour and financial constraints that prevent them from adopting the best practices as quickly as they would like. This table ranks the same projects in order of their ease of adoption. If pork producers would adopt only the easy projects would still provide additional net returns of $12.63 per pig marketed.

Pork producers benefit significantly from research conducted at Prairie Swine Centre. By combining the per market hog net returns of the Easy category ($12.63/pig), the Moderate category ($12.69/pig), and the Difficult category ($8.21/pig) there is a potential to improve net returns by $33.53 per pig marketed given the assumptions of this analysis. Not all pork producers are willing to adopt new research and not all research projects are completely additive so the benefit to the industry will be somewhat less than the total shown here depending on a variety of constraints imposed by the farm, the technology and the marketplace.

The Saskatchewan pork industry's annual benefit of these improvements is approximately $38 million. This net revenue benefit improves the competitiveness of Saskatchewan's pork producers who compete in world markets against other innovative pork producers.

The government of Saskatchewan benefits by obtaining an excellent return on the research investment made of a minimum of $25 for every dollar invested in Prairie Swine Centre over the past six years.

Table 12. Ranking of Economic Return and Ease of Adoption from selected Prairie Swine Centre Research Projects

Project Number	Research Project	Ease of Adoption	Return
01-04	The Effect of Ergot on the Performance of Weanlings	Easy	$6.23
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	Moderate	$4.92
03-04	Electronic Sow Feeder: A Preliminary Report	Difficult	$3.38
00-01	Effect of Feed Presentation on the Feeding Behaviour of Grower-Finisher Pigs	Easy	$2.55
01-03	Effect of Gender and Crowding on Variation in Days to Market	Moderate	$2.16
03-01	Soluable and Insoluable Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake on Grower Pigs	Difficult	$2.08
99-03	The DE Content of Hulless Barley	Moderate	$1.51
02-05	Effect of Dietary Crude Protein and Phase Feeding on Performance of Urinary Nitrogen Excretion of Grower Pigs	Difficult	$1.50
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal	Difficult	$1.25
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	Moderate	$1.22
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	Easy	$1.08
99-01	Performance and Carcass Quality of Growing-Finishing Pigs Submitted to Reduced Nocturnal Temperatures	Easy	$1.03
04-02	Crowding Reduces Performance of Weanling Pigs	Moderate	$0.88
02-01	Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders	Easy	$0.70
01-06	Nutritional Value of High-Oil Oat Groats	Moderate	$0.70
01-01	The Impact of Feeder Adjustment and Group Size/Density on Weanling Pig Performance	Easy	$0.69
01-02	Response to Dietary Energy Concentration and Stocking Density in Weaned Pigs	Moderate	$0.47
02-04	Effects of Large Group Size on Productivity of Grower-Finisher Pigs	Moderate	$0.38
01-07	Replacement of Soybean Meal with Canola Meal in Weaned Pigs	Moderate	$0.27
01-05	Effects of Nipple Drinker Height and Flow Rate on Water Wastage in Grower and Finisher Pigs	Easy	$0.21
99-02	An Oil Sprinkling System for Dust Control in Pig Buildings	Moderate	$0.18
02-02	Reducing Water Waste from Nipple Drinkers by Grower-Finisher Pigs	Easy	$0.14

Table 13. Ranking of Ease of Adoption and Economic Returns from selected Prairie Swine Centre Research Projects

Project Number	Research Project	Ease of Adoption	Return
01-04	The Effect of Ergot on the Performance of Weanlings	Easy	$6.23
00-01	Effect of Feed Presentation on the Feeding Behaviour of Grower-Finisher Pigs	Easy	$2.55
02-03	Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs	Easy	$1.08
99-01	Performance and Carcass Quality of Growing-Finishing Pigs Submitted to Reduced Nocturnal Temperatures	Easy	$1.03
02-01	Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders	Easy	$0.70
01-01	The Impact of Feeder Adjustment and Group Size/Density on Weanling Pig Performance	Easy	$0.69
01-05	Effects of Nipple Drinker Height and Flow Rate on Water Wastage in Grower and Finisher Pigs	Easy	$0.21
02-02	Reducing Water Waste from Nipple Drinkers by Grower-Finisher Pigs	Easy	$0.14
04-01	Response of Growing and Finishing Pigs to Dietary Energy Concentration	Moderate	$4.92
01-03	Effect of Gender and Crowding on Variation in Days to Market	Moderate	$2.16
99-03	The DE Content of Hulless Barley	Moderate	$1.51
03-02	The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery	Moderate	$1.22
04-02	Crowding Reduces Performance of Weanling Pigs	Moderate	$0.88
01-06	Nutritional Value of High-Oil Oat Groats	Moderate	$0.70
01-02	Response to Dietary Energy Concentration and Stocking Density in Weaned Pigs	Moderate	$0.47
02-04	Effects of Large Group Size on Productivity of Grower-Finisher Pigs	Moderate	$0.38
99-02	An Oil Sprinkling System for Dust Control in Pig Buildings	Moderate	$0.18
01-07	Replacement of Soybean Meal with Canola Meal in Weaned Pigs	Moderate	$0.27
03-04	Electronic Sow Feeder: A Preliminary Report	Difficult	$3.38
03-01	Soluable and Insoluable Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake on Grower Pigs	Difficult	$2.08
02-05	Effect of Dietary Crude Protein and Phase Feeding on Performance of Urinary Nitrogen Excretion of Grower Pigs	Difficult	$1.50
03-03	Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola meal	Difficult	$1.25

■ Implications

Farm managers can assess the value of applied research prior to implementing it on their farm. This process reduces financial risk and can lead to an increase in the rate of adoption as the decision process is streamlined and confidence in financial impact can be shared with all stakeholders including owners, managers and lenders.

Saskatchewan's pork industry has a significant advantage with practical research information being available locally and the financial impact of that research completed under practical Saskatchewan farm size, cost structures and current packer payment grids. Nowhere else in Canada has such an extensive review and ranking of applied research been carried out. The publication of these results in Saskatchewan provides a significant advantage to farm managers and owners in this province.

Near-market or applied research can benefit from this analysis by conducting 'what if' analysis prior to conducting animal research work. The results obtained may be useful in applying scarce research dollars to projects that have the greatest potential benefit. It should be noted however that being able to predict accurately improvements in average daily gain or changes in carcass quality are challenging at best. Thus, for research, this financial modeling approach lends its greatest benefit to ensuring that the results of research are readily available in a format that allows farm managers to make an easy adoption decision, and that includes providing a financial performance analysis.

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■ Appendix I – Assumptions

General

- All analyses are conducted assuming an existing operations rather than new construction
- Farrow-to-finish operations (300, 600, 1,200 sow are one-site facilities, and 2,500, 5000 sow operations are multi-site operations.
- Each operation is based on a 25-week production cycle, with an average market weight of 113-114kg
- Average market hog price of $140.00/ckg
- 5 Year average feed prices (Barley: $125.60/mt, Wheat: $140.40/mt, Canola Meal: $213.00/mt, Peas: $173.00/mt, and Soybean Meal: $322.00/mt) all diets formulated based on least cost formulation.
- All diets are assumed to be mash feed, with the exception of Starter 1-3 respectively.
- Feeding program consists of 5 starter diets, 2 grower diets, 4 barrow finisher and 4 gilt finisher diets
- All diet costs include milling and freight charges.
- 300 sow operation employs all-natural breeding, all other operations use 100% artificial insemination.

Production

Category	**300 Sow**	**600 Sow**	**1,200 Sow**	**2,500 Sow**	**5,000 Sow**
Breeding Herd					
Litters/Sow/Year	2.40	2.40	2.40	2.40	2.40
Farrowing Rate	85%	90%	90%	90%	90%
Culling Rate – Sows	40%	40%	40%	40%	40%
Culling Rate – Boars	50%	50%	50%	50%	50%
Replacement Gilts – Cost	$400	$400	$390	$380	$370
Replacement Boars – Cost	$1,150	$1,150	$1,121	$1,092	$1,063
Gilts in pool	5	10	20	40	80
Pigs Born Alive/Litter	11.2	11.2	11.2	11.2	11.2
Pre-Weaning Mortality	10%	10%	10%	10%	10%
Average Weaning Age (days)	18	18	18	18	18
Pigs Weaned/Litter	10.1	10.1	10.1	10.1	10.1
Pigs Weaned/Sow/Year	24.2	24.2	24.2	24.2	24.2
Nursery					
Mortality Rate	2%	2%	2%	2%	2%
Production Cycle (weeks)	7.5	7.5	7.5	7.5	7.5
Avg. Days per Phase	46	46	46	46	46
Stocking Density (ft^2)	3.75	3.75	3.75	3.75	3.75
Barn Building Cost (ft^2)	$47.50	$47.50	$47.50	$47.50	$47.50
Grower-Finisher					
Mortality Rate	2%	2%	2%	2%	2%
Production Cycle (weeks)	14	14	14	14	14
Avg. Days per Phase	93	93	93	93	93
Stocking Density (ft^2)	9.5	9.5	9.5	9.5	9.5
Barn Building Cost (ft^2)	$27.50	$27.50	$27.50	$27.50	$27.50

Operations

- Variable costs are the same across all sizes of operations on a per hog marketed, these include: barn supplies, maintenance/repairs, management fees, marketing/transportation, miscellaneous, office supplies, property tax, utilities, veterinary supplies/fees, and insurance.
- All operations would market hogs on the same grading grid (Mitchell's Gourmet Foods 2004)
- All operations would have the same carcass distribution at shipping, achieving 80% in "core" (85-100klgs dressed)
- All hogs, across farm size, consume the same amount of water and produce the same amount of manure

Finance

- Building depreciation over 20 years.
- Equipment depreciation over 10 years.
- Salvage value is 10% on buildings and equipment respectively.
- Interest on long-term debt, prime (5 year average of 6.09%) plus 2 percent
- Interest on operating, prime plus one percent.
- Capital cost per sow place relative to a 600 farrow-to-finish operation. 300 sow – 2.5% higher, 1,200 sow – 2.5% lower, 2,500 sow – 5% lower, and 5,000 sow – 7.5% lower.

ENTERPRISE RETURNS MODULE (600 Sow Farrow-to-Finish)

Revenues	Default	Research Project	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Default	Research Project	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	306,776	$0.00
Total Feed	807,465	807,465	$0.00
	57.92		
	Default	Research Project	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Research Project
Operating Interest	23,909	23,909
Total Operating	1,371,902	1,371,902
Total Costs	2,092,418	2,092,418
	5 Year Average Feed Cost	
Gross Margin	752,652	752,652
Net Earnings	32,136	32,136
EBITDA	604,335	604,335
ROA	0.64%	0.64%
EBITDA/Sales	28.45%	28.45%
Net Earnings per Hog	$2.30	$2.30

Hog pool price/ckg	$140.00	$140.00

Difference $0.00

ENTERPRISE RETURNS MODULE (600 Sow Farrow-to-Finish)

Revenues	Default	Research Project	Difference
Market Hogs	2,063,895	2,063,894	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00
Capital Asset Values:	Default	Research Project	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	306,776	$0.00
Total Feed	807,465	807,465	$0.00
	57.92		
	Default	Research Project	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Research Project
Operating Interest	23,909	23,909
Total Operating	1,371,902	1,371,902
Total Costs	2,092,418	2,092,418
	5 Year Average Feed Cost	
Gross Margin	752,652	752,652
Net Earnings	32,136	32,136
EBITDA	604,335	604,335
ROA	0.64%	0.64%
EBITDA/Sales	28.45%	28.45%
Net Earnings per Hog	$2.32	$2.32

Hog pool price/ckg	$140.00	$140.00

Difference $0.00

Pig Flow Parameters

Breeding Herd

	Default
Number of Sows	600
Number of Boars	12
Sow to Boar Ratio	50.0
Percentage Sows Bred Natural Service	**0.0%**
Percentage Sows Bred A.I.	100.0%
Litters/Sow/Year	2.40
Average Gestation Length	114
Farrowing Rate	90.0%
Number of Days in Farrowing Room prior to farrowing	4.0
Number of Farrowing Crates Required	27.69
Culling Rate for Sows	40%
Sow Death Rate	3.0%
Culling Rate for Boars	50.0%
Cost of Replacement Gilts	**$400**
Cost of Replacement Boars	**$1,150**
Number of gilts in pool	**10**
Gestation / Stocking Density	21
Gestation barn building cost	$24.25
Farrowing Stocking Density	45
Farrowing barn building cost	$30.50
Pigs Born Alive/Litter	11.20
Total Pigs Born Alive/year	16,128
Percent of Gilts/litter	**50.0%**
Pigs/Sow/Year	26.88
Pre-Weaning Mortality	10.0%
Pre-Weaning Mortality Calculated	**10.0%**
Total Pre-Weaning Mortality	**1,613**
Average Weaning Age	18
Average Weaning Weight	6.2
Pigs Weaned per Litter	**10.08**
Pigs Weaned /Sow/Year	24.19
Total Pigs Weaned	**14,515**

	Nursery	Grower	Finisher
Total Pigs Purchased			
Mortality Rate (%)	2.00%	1.00%	1.00%
Calculated Mortality Rate	**2.00%**	**1.00%**	**1.00%**
Facility Capacity (weeks)	7.5	6	8.0
Overflow capacity (hogs)			
Avg. Number of Days per Phase	46	39	54
Stocking density/pig	3.75	9.5	9.5
Target Number of Pigs Transferred to next Phase	**260**	**258**	**256**
Barn Building Cost	$47.50	$27.50	$27.50
Total Cost			
Number of pig places required	1,950	1,548	2,048
Pig Pricing Factor	1.65	1.25	1
Total pigs transferred in	**14,515**	**14,225**	**14,083**
Total calculated mortalities	**290**	**142**	**141**
Total Pigs Transferred to Nursery	1,210	1,185	1,174
Total Nursery Mortalities	24	12	12
Total Pigs Transferred to Nursery	279	274	271
Total Nursery Mortalities	6	3	3
Steady State of Nursery	1,834	1,524	2,089
Average Turnover	7.93	9.36	6.76
Total pigs transferred out	**14,225**	**14,083**	**13,942**

Pigs Sold/Sow/Year 23.24

Labour and Staffing

	Default	Research Project
No. of Sows	600	600
Manager	1	1
Assistant Manager	1	1
Production Assistant I	2	2
Production Assistant II	1	1
Total Staff	5	5
Total Labour Cost	$177,606	$177,606
Labour Cost per Sow	$296.01	$296.01
Labour Cost per Hog Sold	$12.74	$12.74
Staff per Sow	120	120

Salary Assumptions

Minimum Wage	$9.00	$9.00	
Benefits	15.0%	15.0%	
Production Assistant II	1	1	
Production Assistant I	1.25	1.25	
Assistant Manager	1.5	1.5	
Manager	2.5	2.5	
Overtime	10%	10%	**% of hours worked**
Average work week	40	40	
Hours Worked per Year	2,080	2,080	

	Salaries	**Salaries**
Production Assistant II	20,592	20,592
Production Assistant I	25,740	25,740
Assistant Manager	30,888	30,888
Manager	51,480	51,480

	Benefits	**Benefits**
Production Assistant II	3,089	3,089
Production Assistant I	3,861	3,861
Assistant Manager	4,633	4,633
Manager	7,722	7,722

	Salaries and Beneifts	**Salaries and Beneifts**
Production Assistant II	23,681	23,681
Production Assistant I	29,601	29,601
Assistant Manager	35,521	35,521
Manager	59,202	59,202

Pig Flow Parameters

Breeding Herd

	Default
Number of Sows	600
Number of Boars	12
Sow to Boar Ratio	50:1
Percentage Sows Bred Natural Service	0.0%
Percentage Sows Bred A.I.	100.0%
Litters/Sow/Year	2.40
Average Gestation Length	114
Farrowing Rate	90.0%
Number of Days in Farrowing Room prior to farrowing	4.0
Number of Farrowing Crates Required	27.68
Culling Rate for Sows	40%
Sow Death Rate	3.0%
Culling Rate for Boars	50.0%
Cost of Replacement Gilts	$400
Cost of Replacement Boars	$1,150
Number of gilts in pool	10
Gestation / Stocking Density	21
Gestation barn building cost	$24.25
Farrowing Stocking Density	45
Farrowing barn building cost	$30.50
Pigs Born Alive/Litter	11.20
Total Pigs Born Alive/year	16,128
Percent of Gilts/litter	**50.0%**
Pigs/Sow/Year	26.88
Pre-Weaning Mortality	10.0%
Pre-Weaning Mortality Calculated	**10.0%**
Total Pre-Weaning Mortality	**1,613**
Average Weaning Age	18
Average Weaning Weight	6.2
Pigs Weaned per Litter	**10.08**
Pigs Weaned /Sow/Year	24.19
Total Pigs Weaned	**14,515**

	Nursery	Grower	Finisher
Total Pigs Purchased			
Mortality Rate (%)	2.00%	1.00%	1.00%
Calculated Mortality Rate	**2.00%**	**1.00%**	**1.00%**
Facility Capacity (weeks)	7.5	6	8.0
Overflow capacity (hogs)			
Avg. Number of Days per Phase	46	39	54
Stocking density/pig	3.75	9.5	9.5
Target Number of Pigs Transferred to next Phase	260	258	256
Barn Building Cost	$47.50	$37.50	$27.50
Total Cost			
Number of pig places required	1,950	1,540	2,048
Pig Pricing Factor	1.65	1.25	1
Total pigs transferred in	**14,515**	**14,225**	**14,083**
Total calculated mortalities	**290**	**142**	**141**
Total Pigs Transferred to Nursery	1,210	1,185	1,174
Total Nursery Mortalities	24	12	12
Total Pigs Transferred to Nursery	279	274	271
Total Nursery Mortalities	6	3	3
Steady State of Nursery	1,834	1,524	2,089
Average Turnover	7.93	9.30	6.75
Total pigs transferred out	**14,225**	**14,083**	**13,942**

Pigs Sold/Sow/Year 23.24

Labour and Staffing

	Default	Research Project
No. of Sows	600	600
Manager	1	1
Assistant Manager	1	1
Production Assistant I	2	2
Production Assistant II	1	1
Total Staff	5	5
Total Labour Cost	$177,606	$177,606
Labour Cost per Sow	$296.01	$296.01
Labour Cost per Hog Sold	$12.74	$12.74
Staff per Sow	120	120

Salary Assumptions

Minimum Wage	$9.00	$9.00	
Benefits	15.0%	15.0%	
Production Assistant II	1	1	
Production Assistant I	1.25	1.25	
Assistant Manager	1.5	1.5	
Manager	2.5	2.5	
Overtime	**10%**	**10%**	**% of hours worked**
Average work week	40	40	
Hours Worked per Year	2,080	2,080	

	Salaries	**Salaries**
Production Assistant II	20,592	20,592
Production Assistant I	25,740	25,740
Assistant Manager	30,888	30,888
Manager	51,480	51,480
	Benefits	**Benefits**
Production Assistant II	3,089	3,089
Production Assistant I	3,861	3,861
Assistant Manager	4,633	4,633
Manager	7,722	7,722
	Salaries and Beneifts	**Salaries and Beneifts**
Production Assistant II	23,681	23,681
Production Assistant I	29,601	29,601
Assistant Manager	35,521	35,521
Manager	59,202	59,202

Variable Production Costs

Number of Sows	Default	Research Project	
A.I. Supplies	$0.45	$0.45	per hog marketed
Barn Supplies	$1.50	$1.50	per hog marketed
Maintenance & Repairs	$3.62	$3.62	per hog marketed
Management & Consultant Fees	$1.58	$1.58	per hog marketed
Marketing & Transportation	$5.00	$5.00	per hog marketed
Miscellaneous	$0.05	$0.05	per hog marketed
Office Supplies	$0.25	$0.25	per hog marketed
Propety Tax	$1.15	$1.15	per hog marketed
Utilities (Natural Gas/Power/Phone)	$6.32	$6.32	per hog marketed
Veterinary Supplies	$2.00	$2.00	per hog marketed
Veterinary Fees	$0.50	$0.50	per hog marketed
Labour	$12.74	$12.74	per hog marketed
Insurance: buildings/equipment	$1.10	$1.10	per $ for $100 coverage
Insurance: animals	$1.10	$1.10	per $ for $100 coverage

Annual Variable Costs

	Default	Research Project
A.I. Supplies	$6,274	$6,274
Barn Supplies	$20,913	$20,913
Maintenance & Repairs	$50,469	$50,469
Management & Consultant Fees	$22,028	$22,028
Marketing & Transportation	$69,709	$69,709
Miscellaneous	$697	$697
Office Supplies	$3,485	$3,485
Propety Tax	$16,033	$16,033
Utilities (Natural Gas/Power/Phone)	$88,047	$88,047
Veterinary Supplies	$27,884	$27,884
Veterinary Fees	$6,971	$6,971
Labour	$177,606	$177,606
Insurance: buildings/equipment	$43,265.51	$43,266
Insurance: animals	$10,328.46	$10,328.46

Animal Inventory Valuation

Breeding Herd	$257,800	$257,800
Nursery	$148,306	$148,306
Grower	$227,050	$227,050
Finishing	$305,794	$305,794
Total	$938,951	$938,951

Manure Production and Water Consumption

Water Usage

	Default	Research Project	
	600	600	
Gestation Sows	3.30	3.30	gallons/day
Lactating Sows	4.40	4.40	gallons/day
Gilts/Open Sows	1.76	1.76	gallons/day
Boars	3.30	3.30	gallons/day
Nursery Pigs	0.66	0.66	gallons/day
Grower Pigs	1.540	1.540	gallons/day
Finisher Pigs	1.540	1.540	gallons/day

Manure Production

	600	600	
Gestation Sows	3.50	3.50	gallons/day
Lactating Sows	4.80	4.80	gallons/day
Gilts/Open Sows	2.80	2.80	gallons/day
Boars	3.50	3.50	gallons/day
Nursery Pigs	0.35	0.35	gallons/day
Grower Pigs	1.87	1.87	gallons/day
Finisher Pigs	1.87	1.87	gallons/day

Manure Sales	600	600
Manure Revenue per acre	$20.00	$20.00
Total Manure Revenue	$10,659.93	$10,659.93

Manure Application and Water Usage Costs

	600	600	
Manure handling	$0.009	$0.009	$/gallon
Manure Applied/Acre	6,600	6,600	Gallons/acre
Nutrient Recovery by Crop	43%	43%	
Water	$5.50	$5.50	$/1,000 gallons

Manure handling	$31,660	$31,660
Total Number of Acre Applied	533	533
Manure handling/acre	$59.40	$59.40
Water	$17,687	$17,687

Variable Production Costs

Number of Sows	Default	Research Project	
A.I. Supplies	$0.45	$0.45	per hog marketed
Barn Supplies	$1.50	$1.50	per hog marketed
Maintenance & Repairs	$3.62	$3.62	per hog marketed
Management & Consultant Fees	$1.58	$1.58	per hog marketed
Marketing & Transportation	$5.00	$5.00	per hog marketed
Miscellaneous	$0.05	$0.05	per hog marketed
Office Supplies	$0.25	$0.25	per hog marketed
Propety Tax	$1.15	$1.15	per hog marketed
Utilities (Natural Gas/Power/Phone)	$6.32	$6.32	per hog marketed
Veterinary Supplies	$2.00	$2.00	per hog marketed
Veterinary Fees	$0.50	$0.50	per hog marketed
Labour	$12.74	$12.74	per hog marketed
Insurance: buildings/equipment	$1.10	$1.10	per $ for $100 coverage
Insurance: animals	$1.10	$1.10	per $ for $100 coverage

Annual Variable Costs

	Default	Research Project
A.I. Supplies	$6,274	$6,274
Barn Supplies	$20,913	$20,913
Maintenance & Repairs	$50,469	$50,469
Management & Consultant Fees	$22,028	$22,028
Marketing & Transportation	$69,709	$69,709
Miscellaneous	$697	$697
Office Supplies	$3,485	$3,485
Propety Tax	$16,033	$16,033
Utilities (Natural Gas/Power/Phone)	$88,047	$88,047
Veterinary Supplies	$27,884	$27,884
Veterinary Fees	$6,971	$6,971
Labour	$177,606	$177,606
Insurance: buildings/equipment	$43,265.51	$43,266
Insurance: animals	$10,328.46	$10,328.46

Animal Inventory Valuation

Breeding Herd	$257,800	$257,800
Nursery	$148,306	$148,306
Grower	$227,050	$227,050
Finishing	$305,794	$305,794
Total	$938,951	$938,951

Manure Production and Water Consumption

Water Usage

	Default	Research Project	
	600	600	
Gestation Sows	3.30	3.30	gallons/day
Lactating Sows	4.40	4.40	gallons/day
Gilts/Open Sows	1.76	1.76	gallons/day
Boars	3.30	3.30	gallons/day
Nursery Pigs	0.66	0.66	gallons/day
Grower Pigs	1.540	1.540	gallons/day
Finisher Pigs	1.540	1.540	gallons/day

Manure Production

	600	600	
Gestation Sows	3.50	3.50	gallons/day
Lactating Sows	4.80	4.80	gallons/day
Gilts/Open Sows	2.80	2.80	gallons/day
Boars	3.50	3.50	gallons/day
Nursery Pigs	0.35	0.35	gallons/day
Grower Pigs	1.87	1.87	gallons/day
Finisher Pigs	1.87	1.87	gallons/day

Manure Sales	600	600
Manure Revenue per acre	$20.00	$20.00
Total Manure Revenue	$10.659.93	$10.659.93

Manure Application and Water Usage Costs

	600	600	
Manure handling	$0.009	$0.009	$/gallon
Manure Applied/Acre	6.600	6.600	Gallons/acre
Nutrient Recovery by Crop	43%	43%	
Water	$5.50	$5.50	$/1.000 gallons

Manure handling	$31.660	$31.660
Total Number of Acre Applied	533	533
Manure handling/acre	$59.40	$59.40
Water	$17.687	$17.687

Feeding Programs

5 Year Average Feed Costs

		Barley	Wheat	Peas	Canola Meal	Soybean Meal
Price/mt		$125.60	$140.40	$173.50	$213.40	$322.80
Price/kg		$0.1256	$0.1404	$0.1735	$0.2134	$0.3228

								Total Annual Cost
	Diet Type	Barley	Wheat	Peas	Canola Meal	Soybean Meal	Diet Cost/mt	Default
Gilt Diet	Breeding Herd	300.00	554.20		88.40		$146.62	$1,498.44
Gestation Diet	Breeding Herd	555.56	219.84	146.00		24.67	$160.46	$76,491.35
Lactation Diet	Breeding Herd	228.67	316.90	150.00		187.33	$240.22	$51,022.56
Boar Diet	Breeding Herd	300.00	554.20		88.40		$146.62	$1,926.57
		1,509.96	1,785.68	469.67	390.41	535.12		$130,938.92

BARROWS

									Total Annual Cost
		Diet Type	Barley	Wheat	Peas	Canola Meal	Soybean Meal	Diet Cost/mt	Default
1	Ultrawean unlimitied	Nursery		600.00			200.00	$1,084.57	$3,976.90
2	Ultrawean 21	Nursery		590.57			262.00	$668.00	$9,562.97
3	Starter 3	Nursery		665.00			200.00	$383.60	$22,154.74
4	Starter 4	Nursery	223.67	316.90			337.33	$331.99	$27,807.29
5	Starter 5 PSCE	Nursery	62.00	579.49		25.00	250.00	$242.77	$35,928.52
6	Barrow Grower 1	Grower		651.30	200.00		104.00	$195.04	$42,025.83
7	Barrow Grower 2	Grower		645.40	250.00	76.00		$167.56	$43,418.73
8	Barrow Finisher 1	Finisher	109.00	590.00	173.70	66.70		$147.08	$43,024.06
9	Barrow Finisher 2	Finisher	279.00	420.00	173.70	66.70		$144.57	$45,929.42
10	Barrow Finisher 3	Finisher	556.00	300.00	110.90			$141.43	$32,519.56
11	Barrow Finisher 4	Finisher	756.00	100.00	110.90			$138.47	$34,610.69

GILTS

									Total Annual Cost
		Diet Type	Barley	Wheat	Peas	Canola Meal	Soybean Meal	Diet Cost/mt	Default
1	Ultrawean unlimitied	Nursery		600.00			200.00	$1,084.57	$3,976.90
2	Ultrawean 21	Nursery		590.57			262.00	$668.00	$9,562.97
3	Starter 3	Nursery		665.00			200.00	$383.60	$22,154.74
4	Starter 4	Nursery	223.67	316.90			337.33	$331.99	$27,807.29
5	Starter 5 PSCE	Nursery	62.00	579.49		25.00	250.00	$242.77	$35,928.52
6	Gilt Grower 1	Grower		651.30	200.00		104.00	$195.04	$42,025.83
7	Gilt Grower 2	Grower		645.40	250.00	76.00		$167.56	$43,418.73
8	Gilt Finisher 1	Finisher	59.00	640.00	173.70	66.70		$147.82	$42,873.13
9	Gilt Finisher 2	Finisher	229.00	470.00	173.70	66.70		$145.31	$45,133.08
10	Gilt Finisher 3	Finisher	506.00	350.00	110.90			$142.17	$32,610.25
11	Gilt Finisher 4	Finisher	706.00	150.00	110.90			$139.21	$30,075.98

Feeding Programs

5 Year Average Feed Costs

		Barley	Wheat	Peas	Canola Meal	Soybean Meal
Price/mt		$125.60	$140.40	$173.50	$213.40	$322.80
Price/kg		$0.1256	$0.1404	$0.1735	$0.2134	$0.3228

								Total Annual Cost
	Diet Type	Barley	Wheat	Peas	Canola Meal	Soybean Meal	Diet Cost/mt	Default
Gilt Diet	Breeding Herd	300.00	554.20		88.40		$146.62	$1,498.44
Gestation Diet	Breeding Herd	555.56	219.84	146.00		24.67	$160.46	$76,491.35
Lactation Diet	Breeding Herd	228.67	316.90	150.00		187.33	$240.22	$51,022.56
Boar Diet	Breeding Herd	300.00	554.20		88.40		$146.62	$1,926.57
		1,509.96	1,785.68	469.67	390.41	585.12		$130,938.92

BARROWS

									Total Annual Cost
		Diet Type	Barley	Wheat	Peas	Canola Meal	Soybean Meal	Diet Cost/mt	Default
1	Ultrawean unlimitied	Nursery		600.00			200.00	$1,084.57	$3,976.90
2	Ultrawean 21	Nursery		590.57			262.00	$668.00	$9,562.97
3	Starter 3	Nursery		665.00			200.00	$383.60	$22,154.74
4	Starter 4	Nursery	223.67	316.90			337.33	$331.99	$27,807.29
5	Starter 5 PSCE	Nursery	62.00	579.49		25.00	250.00	$242.77	$35,928.52
6	Barrow Grower 1	Grower		651.30	200.00		104.00	$195.04	$42,025.83
7	Barrow Grower 2	Grower		645.40	250.00	76.00		$167.56	$43,418.73
8	Barrow Finisher 1	Finisher	109.00	590.00	173.70	66.70		$147.08	$43,024.06
9	Barrow Finisher 2	Finisher	279.00	420.00	173.70	66.70		$144.57	$45,929.42
10	Barrow Finisher 3	Finisher	556.00	300.00	110.90			$141.43	$32,519.56
11	Barrow Finisher 4	Finisher	756.00	100.00	110.90			$138.47	$34,610.69

GILTS

									Total Annual Cost
		Diet Type	Barley	Wheat	Peas	Canola Meal	Soybean Meal	Diet Cost/mt	Default
1	Ultrawean unlimitied	Nursery		600.00			200.00	$1,084.57	$3,976.90
2	Ultrawean 21	Nursery		590.57			262.00	$668.00	$9,562.97
3	Starter 3	Nursery		665.00			200.00	$383.60	$22,154.74
4	Starter 4	Nursery	223.67	316.90			337.33	$331.99	$27,807.29
5	Starter 5 PSCE	Nursery	62.00	579.49		25.00	250.00	$242.77	$35,928.52
6	Gilt Grower 1	Grower		651.30	200.00		104.00	$195.04	$42,025.83
7	Gilt Grower 2	Grower		645.40	250.00	76.00		$167.56	$43,418.73
8	Gilt Finisher 1	Finisher	59.00	640.00	173.70	66.70		$147.82	$42,873.13
9	Gilt Finisher 2	Finisher	229.00	470.00	173.70	66.70		$145.31	$45,133.08
10	Gilt Finisher 3	Finisher	506.00	350.00	110.90			$142.17	$32,610.25
11	Gilt Finisher 4	Finisher	706.00	150.00	110.90			$139.21	$30,075.98

BARROWS

PSC Elstow Feed Budget, May 2004

Diet Name	Diet Type	Weight Start	 End	Age In	 Out	ADG (g/day)	Feed to Gain	ADFI (kg/day)
Ultrawean unlimited	Nursery	6.2	6.6	19	23	115	1.10	
Ultrawean 21	Nursery	6.6	8	23	29	300	1.10	
Starter 3	Nursery	8	14	29	42	475	1.30	
Starter 4	Nursery	14	22	42	55	600	1.50	
Starter 5 PSCE	Nursery	22	35	55	72	765	1.60	
Barrow Grower 1	Grower	35	50	72	88	865	2.20	
Barrow Grower 2	Grower	50	65	88	104	920	2.50	
Barrow Finisher 1	Finisher	65	80	104	120	930	2.80	
Barrow Finisher 2	Finisher	80	95	120	136	930	3.05	
Barrow Finisher 3	Finisher	95	105	136	147	880	3.40	
Barrow Finisher 4	Finisher	105	115	147	159	830	3.60	

Diet Name	Diet Type	Days on Feed	Cumulative Age	ADG	Feed to Gain	Avg. Daily Feed Disappearance	Time in Phase	Weight Start	End	Gain/Phase	Feed Disappearance/Hog	Mortalities	Hogs	Total Feed Dissappearnce/Year
Ultrawean unlimited	Nursery	4.0	22.0	115	1.10	0.127	7.5%	6.2	6.7	0.5	0.5	11	7,247	3.7
Ultrawean 21	Nursery	6.0	28.0	300	1.10	0.330	11.3%	6.7	8.5	1.8	2.0	16	7,230	14.3
Starter 3	*Nursery*	13.0	41.0	475	1.30	0.618	24.5%	8.5	14.6	6.2	8.0	36	7,195	57.8
Starter 4	Nursery	13.0	54.0	600	1.50	0.900	24.5%	14.6	22.4	7.8	11.7	36	7,159	83.8
Starter 5 PSCE	Nursery	17.0	71.0	765	1.60	1.224	32.1%	22.4	35.4	13.0	20.8	47	7,112	148.0
Barrow Grower 1	Grower	16.0	87.0	865	2.20	1.903	50.0%	35.4	49.3	13.8	30.4	36	7,077	215.5
Barrow Grower 2	Grower	16.0	103.0	920	2.50	2.300	50.0%	49.3	64.0	14.7	36.8	36	7,041	259.1
Barrow Finisher 1	Finisher	16.0	119.0	930	2.80	2.604	29.1%	64.0	78.9	14.9	41.7	20	7,021	292.5
Barrow Finisher 2	Finisher	16.0	135.0	930	3.05	2.837	29.1%	78.9	93.8	14.9	45.4	20	7,000	317.7
Barrow Finisher 3	Finisher	11.0	146.0	880	3.40	2.992	20.0%	93.8	103.4	9.7	32.9	14	6,986	229.9
Barrow Finisher 4	Finisher	12.0	158.0	830	3.60	2.988	21.8%	103.4	113.4	10.0	35.9	15	6,971	249.9
		140.0	158.0	691.82	2.20	1.71			113.40	107.2	266.1	286.7	6,971	1,872.2

Feeding Programs

GILTS

PSC Elstow Feed Budget, May 2004

Diet Name	Diet Type	Weight		Age		ADG (g/day)	Feed to Gain	ADFI (kg/day)
		Start	End	In	Out			
Ultrawean unlimite	Nursery	6.2	6.6	19	23	115	1.10	
Ultrawean 21	Nursery	6.6	8	23	29	300	1.10	
Starter 3	Nursery	8	14	29	42	475	1.30	
Starter 4	Nursery	14	22	42	55	600	1.50	
Starter 5 PSCE	Nursery	22	35	55	72	765	1.60	
Gilt Grower 1	Grower	35	50	72	88	865	2.20	
Gilt Grower 2	Grower	50	65	88	104	920	2.50	
Gilt Finisher 1	Finisher	65	80	104	121	900	2.70	
Gilt Finisher 2	Finisher	80	95	121	138	900	2.90	
Gilt Finisher 3	Finisher	95	105	138	150	855	3.20	
Gilt Finisher 4	Finisher	105	115	150	161	805	3.50	

Diet Name	Diet Type	Days on Feed	Cumulative Age	ADG	Feed to Gain	Avg. Daily Feed Disappearance	Time in Phase	Weight Start	End	Gain/Phase	Feed Disappearance/Hog	Mortalities	Hogs	Total Feed Dissappearnce/Year
Ultrawean unlimited	Nursery	4.0	22.0	115	1.10	0.127	7.5%	6.2	6.7	0.5	0.5	11	7,247	3.7
Ultrawean 21	Nursery	6.0	28.0	300	1.10	0.330	11.3%	6.7	8.5	1.8	2.0	16	7,230	14.3
Starter 3	Nursery	13.0	41.0	475	1.30	0.618	24.5%	8.5	14.6	6.2	8.0	36	7,195	57.8
Starter 4	Nursery	13.0	54.0	600	1.50	0.900	24.5%	14.6	22.4	7.8	11.7	36	7,159	83.8
Starter 5 PSCE	Nursery	17.0	71.0	765	1.60	1.224	32.1%	22.4	35.4	13.0	20.8	47	7,112	148.0
Gilt Grower 1	Grower	16.0	87.0	865	2.20	1.903	50.0%	35.4	49.3	13.8	30.4	36	7,077	215.5
Gilt Grower 2	Grower	16.0	103.0	920	2.50	2.300	50.0%	49.3	64.0	14.7	36.8	36	7,041	259.1
Gilt Finisher 1	Finisher	17.0	120.0	900	2.70	2.430	29.8%	64.0	79.3	15.3	41.3	20	7,021	290.0
Gilt Finisher 2	Finisher	17.0	137.0	900	2.90	2.610	29.8%	79.3	94.6	15.3	44.4	20	7,000	310.6
Gilt Finisher 3	Finisher	12.0	149.0	855	3.20	2.736	21.1%	94.6	104.9	10.3	32.8	14	6,986	229.4
Gilt Finisher 4	Finisher	11.0	160.0	805	3.50	2.818	19.3%	104.9	113.7	8.9	31.0	15	6,971	216.0
		142.0	160.0	681.82	2.15	1.64			113.72	107.5	259.8	286.7	6,971	1,828.1

Capital Costs

	Farrowing	Nursery	Grower	Finisher	Total
Buildings	*391,885*	*347,344*	*404,415*	*535,040*	*1,678,683*
Manure Storage	160,000	60,000	62,503	87,860	370,363
Equipment	500,000	164,000	192,900	257,200	1,114,100
Land, Permit Application, Site Development	190,000	63,000	69,375	97,520	419,895
Design/Project Management Fees	100,000	35,000	38,615	54,280	227,895
Feed Mill	0	0	0	0	0
Manager's Residence	45,000	15,000	16,362	23,000	99,362
Management Fees, Vehicles & Communications	150,000	50,000	55,795	78,430	334,225
Commissioning Fees	230,000	80,000	85,083	119,600	514,683
New Building Purchases	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
New Manure Storage Purchases	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
New Equipment Purchases	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	*1,766,885*	*814,344*	*925,048*	*1,252,930*	*4,759,206*

Interest and Depreciation

Buildings	$132,685.73	$68,113.01	$76,680.69	$104,286.65	$381,766.09
Equipment	$78,269.51	$25,672.40	$30,196.38	$40,261.84	$174,400.12
Total	$210,955.24	$93,785.41	$106,877.07	$144,548.49	$556,166.21

Fixed Costs

Depreciation	
Buildings	20
Equipment	10

Salvage Value	
Buildings	10.0%
Equipment	10.0%

Interest Rates	
Operating Interest, prime rate plus	1.00%
Long-term debt interest, prime rate plus	2.00%
Canadian prime interest rate	6.095%

Operating Interest	
Purchases made on Credit Line	25%

Capital Costs

	Farrowing	Nursery	Grower	Finisher	Total
Buildings	*391,885*	*347,344*	*404,415*	*535,040*	*1,678,683*
Manure Storage	160,000	60,000	62,503	87,860	370,363
Equipment	500,000	164,000	192,900	257,200	1,114,100
Land, Permit Application, Site Development	190,000	63,000	69,375	97,520	419,895
Design/Project Management Fees	100,000	35,000	38,615	54,280	227,895
Feed Mill	0	0	0	0	0
Manager's Residence	45,000	15,000	16,362	23,000	99,362
Management Fees, Vehicles & Communications	150,000	50,000	55,795	78,430	334,225
Commissioning Fees	230,000	80,000	85,083	119,600	514,683
New Building Purchases	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
New Manure Storage Purchases	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
New Equipment Purchases	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	*1,766,885*	*814,344*	*925,048*	*1,252,930*	*4,759,206*

Interest and Depreciation

Buildings	$132,685.73	$68,113.01	$76,680.69	$104,286.65	$381,766.09
Equipment	$78,269.51	$25,672.40	$30,196.38	$40,261.84	$174,400.12
Total	$210,955.24	$93,785.41	$106,877.07	$144,548.49	$556,166.21

Fixed Costs

Depreciation	
Buildings	20
Equipment	10

Salvage Value	
Buildings	10.0%
Equipment	10.0%

Interest Rates	
Operating Interest, prime rate plus	1.00%
Long-term debt interest, prime rate plus	2.00%
Canadian prime interest rate	6.095%

Operating Interest	
Purchases made on Credit Line	25%

Hog Carcass Distribution

Average Values by Weight Class

Default

Weight range (kgs)		Hogs	Percent	Weight	Lean Yield	Index	Weight	Loin	Lean	Health	Value
	69.99	2	0.3%	65.00	54.14	50.0					$45.50
70	74.99	4	0.6%	74.30	61.56	75.0		$3.00			$81.02
75	79.99	8	1.2%	77.60	59.93	92.5		$2.13			$102.62
80	84.99	20	3.0%	83.16	61.12	109.4		$1.98			$129.34
85	89.99	97	14.4%	88.53	61.06	114.1	$3.00	$2.41			$146.82
90	94.99	282	41.8%	92.25	60.34	112.5	$3.00	$2.31			$150.63
95	99.99	138	20.5%	97.55	59.99	111.0	$2.00	$2.23			$155.84
100	104.99	63	9.3%	101.94	60.90	108.4		$3.06			$157.83
105	109.99	22	3.3%	109.15	60.72	100.0		$3.50			$156.31
110	114.99	23	3.4%	111.66	58.71	83.7		$2.96			$133.79
115	119.99	10	1.5%	118.90	56.56	50.0		$1.13			$84.36
120	999.99	5	0.7%	120.40	55.82	50.0		$0.75			$85.03
		674	100.0%	94.72	59.24						

		Barrows		Gilts	
Weight range (kgs)		6,971	Total Sales	6,971	Total Sales
0	69.99	21	$941.18	21	$941.18
70	74.99	41	$3,351.62	41	$3,351.62
75	79.99	83	$8,490.61	83	$8,490.61
80	84.99	207	$26,754.82	207	$26,754.82
85	89.99	1,003	$147,297.03	1,003	$147,297.03
90	94.99	2,917	$439,331.85	2,917	$439,331.85
95	99.99	1,427	$222,428.14	1,427	$222,428.14
100	104.99	652	$102,839.36	652	$102,839.36
105	109.99	228	$35,566.33	228	$35,566.33
110	114.99	238	$31,826.86	238	$31,826.86
115	119.99	103	$8,724.50	103	$8,724.50
120	999.99	52	$4,397.16	52	$4,397.16
		6,971	$1,031,949.45	6,971	$1,031,949.45

Total Sales	13,942
Total Sales ($)	$2,063,898.91

Sow Price	$90.00
Avg Sow Weight	300
Dressing Percentage	70%

Boar Price	$40.00
Avg Boar Weight	350
Dressing Percentage	50%

Hog Carcass Distribution

Average Values by Weight Class

Default

Weight range (kgs)		Hogs	Percent	Weight	Lean Yield	Index	Weight	Loin	Lean	Health	Value
	69.99	2	0.3%	65.00	54.14	50.0					$45.50
70	74.99	4	0.6%	74.30	61.56	75.0		$3.00			$81.02
75	79.99	8	1.2%	77.60	59.93	92.5		$2.13			$102.62
80	84.99	20	3.0%	83.16	61.12	109.4		$1.98			$129.34
85	89.99	97	14.4%	88.53	61.06	114.1	$3.00	$2.41			$146.82
90	94.99	282	41.8%	92.25	60.34	112.5	$3.00	$2.31			$150.63
95	99.99	138	20.5%	97.55	59.99	111.0	$2.00	$2.23			$155.84
100	104.99	63	9.3%	101.94	60.90	108.4		$3.06			$157.83
105	109.99	22	3.3%	109.15	60.72	100.0		$3.50			$156.31
110	114.99	23	3.4%	111.66	58.71	83.7		$2.96			$133.79
115	119.99	10	1.5%	118.90	56.56	50.0		$1.13			$84.36
120	999.99	5	0.7%	120.40	55.82	50.0		$0.75			$85.03
		674	100.0%	94.72	59.24						

		Barrows		Gilts	
Weight range (kgs)		6,971	Total Sales	6,971	Total Sales
0	69.99	21	$941.18	21	$941.18
70	74.99	41	$3,351.62	41	$3,351.62
75	79.99	83	$8,490.61	83	$8,490.61
80	84.99	207	$26,754.82	207	$26,754.82
85	89.99	1,003	$147,297.03	1,003	$147,297.03
90	94.99	2,917	$439,331.85	2,917	$439,331.85
95	99.99	1,427	$222,428.14	1,427	$222,428.14
100	104.99	652	$102,839.36	652	$102,839.36
105	109.99	228	$35,566.33	228	$35,566.33
110	114.99	238	$31,826.86	238	$31,826.86
115	119.99	103	$8,724.50	103	$8,724.50
120	999.99	52	$4,397.16	52	$4,397.16
		6,971	$1,031,949.45	6,971	$1,031,949.45

Total Sales 13,942 Total Sales ($) $2,063,898.91

Sow Price	$90.00
Avg Sow Weight	300
Dressing Percentage	70%

Boar Price	$40.00
Avg Boar Weight	350
Dressing Percentage	50%

▪ Appendix II – Prairie Swine Centre Research Project Economic Analysis

Response of Growing-Finishing Pigs to Dietary Energy Concentration

J.F. Patience[1], A.D. Beaulieu[1], N. Williams[2], and D.Gillis[1]

Summary

The objective of this experiment was to develop an energy response curve for pigs in the growing and finishing phases of production. The diets varied in DE content (3.1, 3.2, 3.3, 3.4 and 3.6 Mcal DE/kg) and were fed from 25 kg to market. Feeding lower energy, lower cost diets, had no effect on ADG or on loin thickness, but did improve feed efficiency and reduced backfat thickness. These results indicate that lower energy diets may be used to increase net income. The applicability of these results amongst a diversity of commercial herds probably depends on feed intake, and the ability of pigs to increase feed intake on the lower energy diets. Nonetheless, the potential for substantially increasing net income warrants careful consideration of dietary energy levels during the growout period. In this experiment, return over feed cost varied by more than $10 per pig across the 5 dietary treatments.

Introduction

"In this trial, feeding lower energy, lower cost diets had no effect on ADG or on loin thickness, but did improve feed efficiency, and reduced backfat thickness."

The primary objective of pork production is to produce lean meat in a cost effective and sustainable manner. Because energy is considered to be the most important driver of growth in the diet, achieving the full genetic potential for growth in the modern pig requires a clear and definitive understanding of the energy response curve in all phases of production. Despite the importance of energy in the design of commercial feeding programs, and the impact that daily intake has on energy supply, there has been surprisingly little information developed on animal response to energy intake. The little information that is available tends to emphasize whole body growth and reveals little in terms of the partitioning of energy into protein, lipid, water and ash. Establishing responses to nutrient intake levels is particularly critical in defining feeding programs to maximize carcass quality.

Experimental Procedure

Five experimental treatments were employed: 3.1, 3.2, 3.3, 3.4 and 3.6 Mcal DE/kg. This range covers that which might be reasonably used in commercial practice, although both the lowest and highest DE values would be unusual. Diets were formulated to ensure that amino acids were not limiting the response to energy; barrows followed a separate feeding regime as compared to gilts, such that the digestible lysine:DE ratios were 2.80, 2.45 and 1.95 g/Mcal for barrows and 2.90, 2.55 and 2.05 g/Mcal for 25 to 50, 50 to 80 and 80 to 120 kg BW, respectively. Diet DE was constant within a treatment for the complete growout period. Diets were based on barley and soymeal and, depending on the energy level incorporated varying amounts of wheat and canola oil.

Table 1. The effect of dietary energy density on body weight, ADG, ADFI and feed conversion over 3 phases of growth

	Diet (Measured DE, Mcal/kg[1])						
Parameter	3.09	3.24	3.34	3.42	3.57	SEM	Regression
Phase 1							
Wt, kg (day 0)	31.17	31.06	31.52	31.19	31.08	0.24	ns[2]
ADG, kg/d	0.95	0.97	0.98	0.98	0.99	0.01	ns
ADFI, kg/d	1.95	1.95	1.91	1.88	1.87	0.03	ns
FCE, gain:feed	0.49	0.50	0.52	0.52	0.53	0.01	L
Phase 2							
Wt, kg (day 0)	53.15	52.97	53.38	53.39	53.48	0.33	ns
ADG, kg/d	1.04	1.08	1.10	1.06	1.06	0.03	ns
ADFI, kg/d	2.74	2.72	2.74	2.51	2.51	0.04	ns
FCE, gain:feed	0.38	0.40	0.41	0.41	0.43	0.01	L
Phase 3							
Wt, kg (day 0)	80.10	79.47	80.30	80.16	80.22	0.44	ns
Wt, kg (end)	115.07	115.51	115.26	115.02	115.58	0.41	ns
ADG, kg/d	1.04	1.08	1.10	1.07	1.06	0.03	ns
ADFI, kg/d	3.29	3.19	3.20	3.35	2.94	0.05	ns
FCE, gain:feed	0.30	0.32	0.32	0.33	0.35	0.01	L
Overall							
ADG, kg/d	1.00	1.02	1.03	1.01	1.05	0.01	ns
ADFI, kg/d	2.75	2.69	2.67	2.59	2.49	0.03	L
FCE, gain:feed	0.36	0.38	0.38	0.39	0.42	0.01	L

[1] Refers to the energy concentration which was determined experimentally at the mid-point of each phase.

[2] ns: the response to dietary energy level was not linear (P>0.05); L, a significant response to dietary energy level was observed (P < 0.05).

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[1] Prairie Swine Centre Inc., [2] PIC Franklin, Kentucky, USA

Results and Discussion

Energy density of the diet had no effect on ADG during any phase, or when calculated over the entire experimental period (Table 1). Feed intake declined as the energy density of the diet increased and feed efficiency was improved. Increasing the energy density of the diet resulted in a reduced lean yield and reduced backfat thickness (Table 2); surprisingly there was no effect on carcass value or on carcass premiums.

It is important to note that by commercial standards, pigs on this experiment exhibited a high feed intake and this could explain the lack of growth response to increases in dietary energy concentration. If feed intake had been lower, the response of the pigs to dietary energy concentration may have been different. A similar experiment is presently being conducted at a commercial farm to test this hypothesis.

Conclusion

In this trial, feeding lower energy, lower cost diets had no effect on ADG or on loin thickness, but did improve feed efficiency, and reduced backfat thickness. This indicates that lower energy diets may be used to increase net income. This experiment was conducted in an environment of high feed intake, and different results may accrue under conditions of lower feed intake. At the time of this trial, the lowest energy diet increased return over feed cost by more than $10 per pig sold, as compared to the highest energy diet.

Acknowledgements

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund. Support for this experiment from PIC is greatly appreciated.

Table 2. The effect of dietary energy density, gender and initial bodyweight on carcass value, days on test and feed cost over 3 phases of growth.

	Diet (Measured DE, Mcal/kg)						
Parameter	3.09	3.24	3.34	3.42	3.57	SEM	Reg
Settlement Wt. (kg)	89.91	90.01	90.88	90.2	91.22	0.37	L
Index	113.81	112.91	113.45	111.70	113.24	0.48	ns
Yield	61.58	61.13	60.88	61.14	60.63	0.18	L
Fat, mm	16.83	17.79	18.33	18.62	19.39	0.34	ns
Lean, mm	61.65	60.55	62.72	60.25	61.06	1.06	ns
Price, $/pig	1.10	1.10	1.10	1.10	1.10	0.01	ns
Value, $/pig	111.36	111.63	111.67	110.20	112.75	1.16	ns
Premium, $/pig	5.56	5.33	5.53	5.06	5.00	0.18	L
			Days on Test				
Phase 1	23.3	23.0	22.8	22.9	22.9	0.48	ns
Phase 2	25.9	24.8	24.6	25.0	25.0	0.49	ns
Phase 3	35.4	35.8	36.8	34.6	34.0	1.07	ns
			Feed Cost, $/pig				
Phase 1	8.36	8.96	9.38	10.39	11.36	0.19	L
Phase 2	12.06	12.70	13.93	14.81	15.46	0.25	L
Phase 3	17.40	19.13	21.85	21.82	22.70	0.55	L
Total	37.76	40.76	45.16	47.03	49.52	0.61	L

[1] ns: the response to dietary energy level was not linear (P>0.05). L: a significant response to dietary energy level was observed (P < 0.05).

"The lowest energy diet increased return over feed cost by more than $10 per pig sold."

ENTERPRISE RETURNS MODULE

Project 04-01

Revenues	3.57 DE	3.34 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00
Capital Asset Values	3.57 DE	3.34 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	3.57 DE	3.34 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	191,183	$0.55
Grower Diets	170,889	159,554	$0.81
Finisher Diets	306,776	280,107	$1.91
Total Feed	807,465	761,782	$3.28
	57.92		
	3.57 DE	3.34 DE	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.57 DE	3.34 DE
Operating Interest	23,909	23,099
Total Operating	1,371,902	1,325,409
Total Costs	2,092,418	2,045,925
	5 Year Average Feed Cost	
Gross Margin	752,652	799,145
Net Earnings	32,136	78,628
EBITDA	604,335	650,828
ROA	0.64%	1.57%
EBITDA/Sales	28.45%	30.63%
Net Earnings per Hog	$2.30	$5.64

Hog pool price/ckg	$140.00	$140.00
	Difference	$3.34

ENTERPRISE RETURNS MODULE

Project 04-01

Revenues	3.57 DE	3.42 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00
Capital Asset Values	3.57 DE	3.42 DE	
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Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	3.57 DE	3.42 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	196,971	$0.14
Grower Diets	170,889	169,745	$0.08
Finisher Diets	306,776	301,642	$0.37
Total Feed	807,465	799,297	$0.59
	57.92		
	3.57 DE	3.42 DE	
Misc. Costs:			
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Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.57 DE	3.42 DE
Operating Interest	23,909	23,764
Total Operating	1,371,902	1,363,589
Total Costs	2,092,418	2,084,106
	5 Year Average Feed Cost	
Gross Margin	752,652	760,964
Net Earnings	32,136	40,448
EBITDA	604,335	612,647
ROA	0.64%	0.81%
EBITDA/Sales	28.45%	28.84%
Net Earnings per Hog	$2.30	$2.90

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.60

ENTERPRISE RETURNS MODULE

Project 04-0

Revenues	3.57 DE	3.34 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00
Capital Asset Values	3.57 DE	3.34 DE	
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Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
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Total Feed	807,465	761,782	$3.28
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Net Earnings	32,136	78,628
EBITDA	604,335	650,828
ROA	0.64%	1.57%
EBITDA/Sales	28.45%	30.63%
Net Earnings per Hog	[illegible]	[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference [illegible]

ENTERPRISE RETURNS MODULE

Project 04-0

Revenues	3.57 DE	3.42 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
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Nursery Diets	198,861	196,971	$0.14
Grower Diets	170,889	169,745	$0.08
Finisher Diets	306,776	301,642	$0.37
Total Feed	807,465	799,297	$0.59
	57.92		

	3.57 DE	3.42 DE	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
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Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.57 DE	3.42 DE
Operating Interest	23,909	23,764
Total Operating	1,371,902	1,363,589
Total Costs	2,092,418	2,084,106
	5 Year Average Feed Cost	
Gross Margin	752,652	760,964
Net Earnings	32,136	40,448
EBITDA	604,335	612,647
ROA	0.64%	0.81%
EBITDA/Sales	28.45%	28.84%
Net Earnings per Hog	$2.30	$2.90

Hog pool price/ckg	$140.00	$140.00

Difference $0.60

ENTERPRISE RETURNS MODULE

Project 04-01

Revenues	3.57 DE	3.24 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	3.57 DE	3.24 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	3.57 DE	3.24 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	186,369	$0.90
Grower Diets	170,889	144,896	$1.86
Finisher Diets	306,776	250,604	$4.03
Total Feed	807,465	712,808	$6.79
	57.92		

	3.57 DE	3.24 DE	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	3.57 DE	3.24 DE
Operating Interest	23,909	22,230
Total Operating	1,371,902	1,275,566
Total Costs	2,092,418	1,996,082
	5 Year Average Feed Cost	
Gross Margin	752,652	848,988
Net Earnings	32,136	128,471
EBITDA	604,335	700,671
ROA	0.64%	2.56%
EBITDA/Sales	28.45%	32.98%
Net Earnings per Hog	$2.30	$9.21

Hog pool price/ckg	$140.00	$140.00

Difference $6.91

ENTERPRISE RETURNS MODULE

Project 04-01

Revenues	3.57 DE	3.09 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00
Capital Asset Values:	3.57 DE	3.09 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	3.57 DE	3.09 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	184,608	$1.02
Grower Diets	170,889	137,473	$2.40
Finisher Diets	306,776	233,400	$5.26
Total Feed	807,465	686,421	$8.68
	57.92		
	3.57 DE	3.09 DE	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
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Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.57 DE	3.09 DE
Operating Interest	23,909	21,762
Total Operating	1,371,902	1,248,710
Total Costs	2,092,418	1,969,227
	5 Year Average Feed Cost	
Gross Margin	752,652	875,843
Net Earnings	32,136	155,327
EBITDA	604,335	727,526
ROA	0.64%	3.10%
EBITDA/Sales	28.45%	34.24%
Net Earnings per Hog	$2.30	$11.14
Hog pool price/ckg	$140.00	$140.00

Difference $8.84

ENTERPRISE RETURNS MODULE

Project (14-01)

Revenues	3.57 DE	3.24 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values	3.57 DE	3.24 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	3.57 DE	3.24 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	186,369	$0.90
Grower Diets	170,889	144,896	$1.86
Finisher Diets	306,776	250,604	$4.63
Total Feed	807,465	712,808	$6.79
	57.92		

	3.57 DE	3.24 DE	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.57 DE	3.24 DE
Operating Interest	23,909	22,230
Total Operating	1,371,902	1,275,566
Total Costs	2,092,418	1,996,082
		5 Year Average Feed Cost
Gross Margin	752,652	848,988
Net Earnings	32,136	128,472
EBITDA	604,335	700,671
ROA	0.64%	2.56%
EBITDA/Sales	28.45%	32.98%
Net Earnings per Hog	$2.30	$9.2

Hog pool price/ckg	$140.00	$140.00

Difference $6.9

ENTERPRISE RETURNS MODULE

Project 04-0

Revenues:	3.57 DE	3.09 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00
Capital Asset Values:	3.57 DE	3.09 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	3.57 DE	3.09 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	184,608	$1.02
Grower Diets	170,889	137,473	$2.40
Finisher Diets	306,776	233,400	$5.26
Total Feed	807,465	686,421	$8.68
	57.92		
	3.57 DE	3.09 DE	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	3.57 DE	3.09 DE
Operating Interest	23,909	21,762
Total Operating	1,371,902	1,248,710
Total Costs	2,092,418	1,969,227
	5 Year Average Feed Cost	
Gross Margin	752,652	875,843
Net Earnings	32,136	155,327
EBITDA	604,335	727,526
ROA	0.64%	3.10%
EBITDA/Sales	28.45%	34.24%
Net Earnings per Hog	$2.30	$11.14

Hog pool price/ckg	$140.00	$140.00
	Difference	$8.84

Crowding Reduces Performance of Weanling Pigs

J.P. Patience[1], H.W. Gonyou[1], A.D. Beaulieu[1], D. Gillis[1] and B. Lawrence[2]

Summary

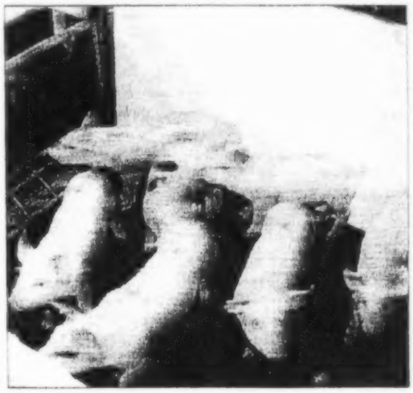
The effect of floor space allowance on the performance of weanling pigs was examined by housing groups of 17 pigs in pens with a floor space of either 5.58 m^2 (uncrowded) or 4.00 m^2 (crowded). Crowding adversely affected growth and feed intake by week 4 post-weaning. These data support the current recommendations on floor space allowance for weanling pigs.

Introduction

Floor space allowance is an important variable in pig production. However, the effect of floor space on performance is often examined by using different group sizes within a constant floor space. This confounds the results because group size per se may affect performance as well as floor space. In this experiment, floor space allowance was examined using a constant group size of 17 pigs, but housed in pens of varying square footage. According to the Recommended Code of Practice, (Agriculture Canada, 1993), floor space allowance can be calculated using the formula, $A = k\,BW^{.67}$ where A = area in m^2 and BW is in kilograms. It is recommended that the coefficient, *k*, be 0.035 when fully slatted pens are used (ie. for a 20 kg pig, $A = 0.035\,(20)^{.67}$ or $A = 0.26\ m^2$ per pig).

> *"Crowding adversely affected growth and feed intake by week 4 post-weaning."*

This experiment was part of a larger trial designed to examine the interaction of various dietary treatments and crowding on the growth and variability in growth of weanling pigs. There were no interactions, and only the main effects of the crowding are reported here.



Experimental Procedures

A total of 816 weaning pigs were assigned to either a crowded or a noncrowded treatment. A false back wall was installed in the pens designated "crowded" to provide the

Table 1. The effect of reduced floor space allowance on the performance of weanling pigs

	Uncrowded 17 pigs/pen	Crowded 17 pigs/pen	
Pen size	5.58 m^2	4.00 m^2	P value*
	BW, kg		
d 0	5.64	5.64	----
d 8	6.49	6.51	0.71
d 14	8.11	8.12	0.92
d 22	11.53	11.49	0.74
d 35	19.12	18.93	0.29
d 42	24.12	23.62	0.03
d 54	33.66	32.69	0.0004
	ADG, kg/day		
d 0-8	0.107	0.109	0.68
d 9-14	0.256	0.262	0.51
d 15-22	0.428	0.421	0.52
d 23-28	0.485	0.480	0.73
d 29-35	0.658	0.647	0.34
d 36-42	0.714	0.671	0.003
d 43-54	0.795	0.748	0.0002
	ADFI, kg/day		
d 0-8	0.133	0.138	0.26
d 9-14	0.313	0.312	0.98
d 15-22	0.521	0.529	0.49
d 23-28	0.641	0.624	0.09
d 29-35	0.861	0.838	0.04
d 36-42	1.083	1.0445	0.01
d 43-54	1.338	1.265	0.0001
	Gain:Feed		
d 0-8	0.794	0.780	0.63
d 9-14	0.820	0.837	0.50
d 15-22	0.827	0.798	0.12
d 23-28	0.754	0.769	0.35
d 29-35	0.765	0.773	0.39
d 36-42	0.659	0.642	0.09
d 43-54	0.595	0.591	0.61
	Total Feed Cost, $/pig		
d 0 – 54	12.91	12.71	0.20
	Feed cost per kg of gain, $/kg		
d 0 - 54	0.457	0.464	0.09

*Initial weight was used as a covariate in the statistical analysis specified area of 0.23 m^2 per pig for the crowded treatment vs 0.35 m^2 per pig for the normal treatment (2.5 vs 3.75 ft^2/pig). Using the Agriculture Canada recommendation of 0.035 for k, pigs with a floor space allowance of 0.35 m^2 are "crowded" at a bodyweight of about 30 kg, while those with the reduced pen size will be crowded at a bodyweight of about 17 kg.

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[1] Prairie Swine Centre Inc., Saskatoon, SK Canada [2] Ridley Inc., Mankato, MN USA

Results and Discussion

An effect of crowding on growth was evident by the 5th week of this experiment when ADG was reduced by about 40 grams per pig per day in the crowded treatment. At this point in the experiment, bodyweight in the crowded treatment was about 19 kg or just slightly above the 17 kg predicted by the Agriculture Canada formula. A reduced feed intake was observed by the 4th week of the experiment in the crowded pens, when the pigs weighed almost 12 kg. Neither feed efficiency nor the cost per kg of gain were affected by floor space allowance and there was no effect of crowding on the variability in growth (data not shown).

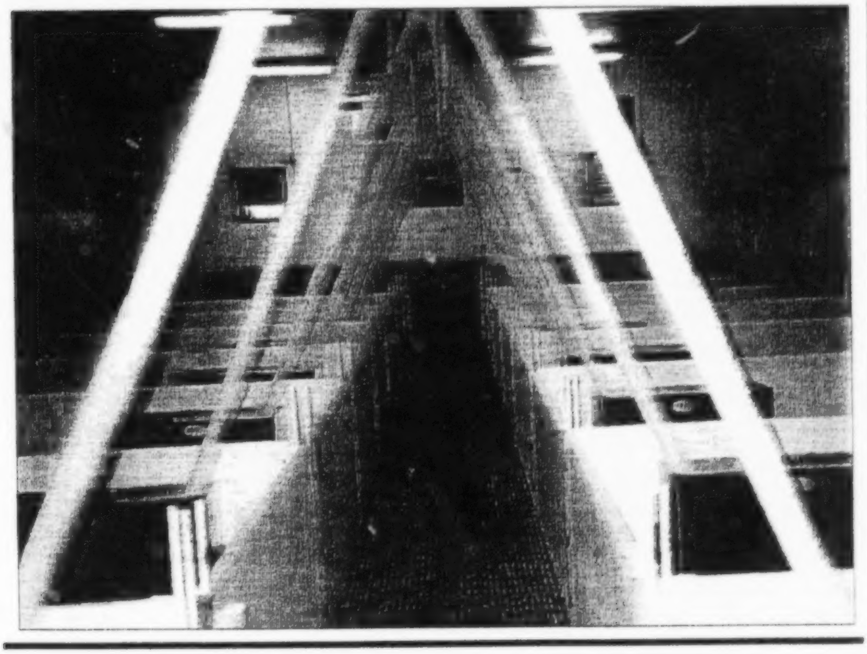
Conclusions

Housing pigs with less than the recommended floor space allowance will reduce growth and feed intake. The current recommendations for floor space of weanling pigs would appear to be correct.

Acknowledgements

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund. The authors would like to acknowledge the financial support provided for this experiment by Ridley, Inc.

"Current recommendations for floor space of weanling pigs would appear to be correct."



ENTERPRISE RETURNS MODULE

Project 04-2

Revenues	5.6 square meters	4.0 square meters	Difference
Market Hogs	2,063,899	2,040,450	-$1.68
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,101,105	-$1.68

Capital Asset Values	5.6 square meters	4.0 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	5.6 square meters	4.0 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	195,088	$0.27
Grower Diets	170,889	168,326	$0.18
Finisher Diets	306,776	302,175	$0.33
Total Feed	807,465	796,527	$0.78
	57.92		

	5.6 square meters	4.0 square meters	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	5.6 square meters	4.0 square meters
Operating Interest	23,909	23,715
Total Operating	1,371,902	1,360,770
Total Costs	2,092,418	2,081,286
	5 Year Average Feed Cost	
Gross Margin	752,652	740,335
Net Earnings	32,136	19,819
EBITDA	604,335	592,018
ROA	0.64%	0.40%
EBITDA/Sales	28.45%	28.18%
Net Earnings per Hog	$2.30	$1.42

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.88)

ENTERPRISE RETURNS MODULE

Project 04-02

Revenues:	5.6 square meters	4.0 square meters	Difference
Market Hogs	2,063,899	2,040,450	-$1.68
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,101,105	-$1.68

Capital Asset Values:	5.6 square meters	4.0 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	5.6 square meters	4.0 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	195,088	$0.27
Grower Diets	170,889	168,326	$0.18
Finisher Diets	306,776	302,175	$0.33
Total Feed	807,465	796,527	$0.78
	57.92		

	5.6 square meters	4.0 square meters	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	5.6 square meters	4.0 square meters
Operating Interest	23,909	23,715
Total Operating	1,371,902	1,360,770
Total Costs	2,092,418	2,081,286
	5 Year Average Feed Cost	
Gross Margin	752,652	740,335
Net Earnings	32,136	19,819
EBITDA	604,335	592,018
ROA	0.64%	0.40%
EBITDA/Sales	28.45%	28.18%
Net Earnings per Hog	$2.30	$1.42

Hog pool price/ckg	$140.00	$140.00

Difference ($0.88)

Soluble and Insoluble Non-Starch Polysaccharides on Digesta Passage Rate and Voluntary Feed Intake of Grower Pigs

A. Owusu-Asiedu[1], J.F. Patience[1], B. Laarveld[2], P.H. Simmins[3], and R.T. Zijlstra[1]

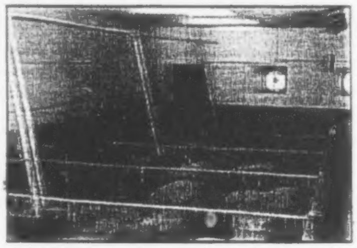
Summary

The effects of purified non-starch polysaccharide (NSP) fractions (soluble, guar gum (SOL) and insoluble, cellulose (INSOL)) NSP fractions on digesta passage rate, retention time and voluntary feed intake was studied in grower pigs. Compared to control, adding SOL+INSOL increased digesta viscosity, slowed digesta flow rate and increased retention time in the total tract. Voluntary feed intake and daily weight gain reduced with SOL+INSOL NSP, compared to pigs fed the control diet. Reduction in voluntary feed intake associated with feeding high fibrous diet in pigs may be a direct effect of the fibre fractions slowing the flow rate of digesta through the gastrointestinal tract. Thus, reducing the negative effects of soluble and insoluble NSP may enhance feed intake and improve grower pig performance.

Introduction

The use of alternative non-conventional feed ingredients to supplement and/or as a substitute to conventional feed ingredients in pig ration can be attractive economically. However, voluntary feed intake and feed utilization of pigs may be compromised due to broad range of NSP present in the cell walls of plant-based feedstuffs. Non-starch polysaccharides are not digestible, and in certain cases, may act as anti-nutrients due to the lack of appropriate digestive enzymes. The mechanism for the reduction in voluntary feed intake associated with feeding fibrous ingredients is complex and poorly understood. To reduce negative effects of NSP on voluntary feed intake, the physical and chemical characteristics of NSP and the physiological changes occurring in grower pigs due to NSP fractions need to be understood. The hypothesis that reduction in voluntary feed intake associated with feeding high fibrous diets to grower pigs may be directly relate to the NSP fractions (soluble or insoluble) altering digesta passage rate through the gut was tested.

Experimental Procedure



Twelve grower pigs fitted with ileal T-cannula were used in a two-period change-over design, providing 3 pigs/diet/period in the first trial. Experimental period was 18 d: a 13-d acclimation to the experimental diet, a 2-d faeces sampling, a 2-d digesta collection for passage rate and a 1 d blood sampling for plasma glucose and ghrelin levels. Experimental diets were; 1) corn-soybean meal diet with 14% corn-starch, as a purified carbohydrate source (**control**); 2) control diet with 7% soluble NSP (**SOL**); 3) control diet with 7% insoluble NSP (**INSOL**); and 4) control with 7% soluble + 7% insoluble NSP (**SOL+INSOL**), with purified NSP fraction replacing cornstarch at a 1:1 ratio. The control diet was formulated to 3.5 Mcal DE /kg and 2.4 g Dlys/Mcal DE and diets were fed at 3 x maintenance based on the control diet. In trial two, 20 individually housed pigs (5 pigs per treatment) were randomly

Figure 1. Fibre fractions on ileal digesta viscosity

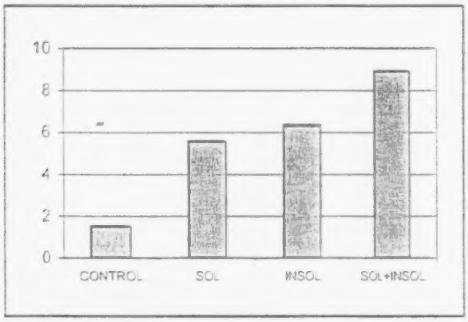
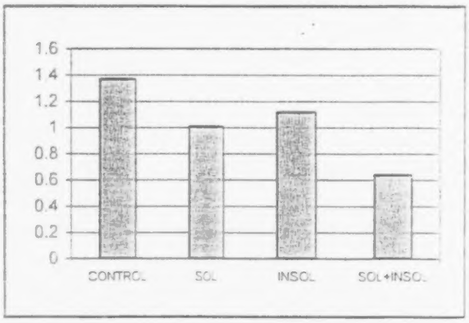


Figure 2. Fibre fractions on ileal digesta passage rate in grower pigs



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[1]Prairie Swine Centre Inc. Saskatoon, SK, [2]University of Saskatchewan, Saskatoon, SK, [3]Danisco Animal Nutrition, Marlborough, UK

assigned to one of four dietary treatments in a 14-d performance trial. Pigs had free access to feed and water daily, and weight gain and feed disappearance were recorded weekly.

Results and Discussion

Addition of SOL and INSOL NSP increased digesta viscosity from 1.52 to 8.92 centipoids, while digesta passage rate decreased from 1.37 to 0.64 %/h, indicating that less digesta flow through the gut with addition of NSP (Fig. 1 and 2). Total tract mean retention time based on initial appearance of ferric oxide in feces was highest for SOL-fed pigs (Figure 3). Plasma glucose reduced by SOL+INSOL prior to morning feeding, but not after feeding, while plasma ghrelin level was highest for SOL and INSOL but not for the control or SOL+INSOL-fed pigs (Fig. 4). Average daily feed intake and daily weight gain decreased with addition of SOL and INSOL NSP, compared to the control diet (Figure 5).

The above studies indicate that purified soluble and insoluble NSP are not inert in the gut and that, individually, or in combination act to increase intestinal viscosity and reduced the flow of digesta through the gastrointestinal tract, thereby reducing voluntary feed intake.

Bottom Line

Both purified soluble and insoluble NSP slowed digesta passage rate and increased total tract retention time in grower pigs, resulting in reduced voluntary feed intake. Reducing the negative effect of dietary NSP by either addition of enzyme or processing may

Figure 3. Fibre fractions on digesta retention time based on initial appearance of ferric oxide in faeces

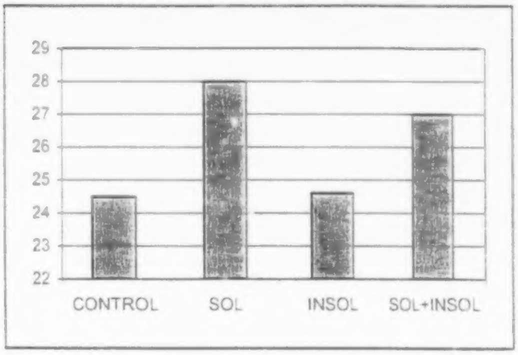


Figure 4. Fibre fractions on plasma ghrelin levels

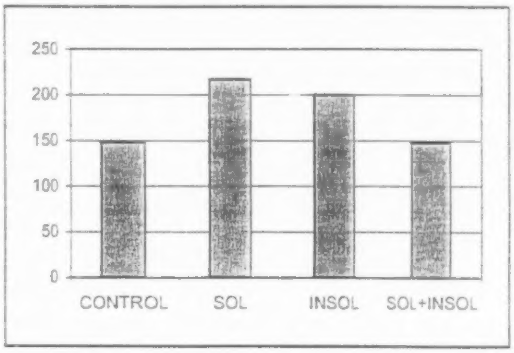
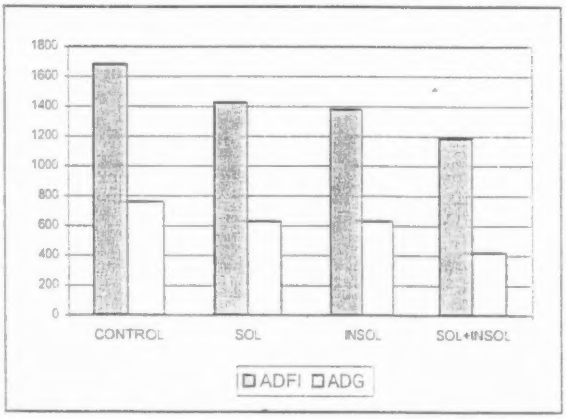


Figure 5. Fibre fractions on daily feed intake and weight gain in grower pigs



ENTERPRISE RETURNS MODULE

Project 03-01

Revenues	Control	INSOL - NSP	Difference
Market Hogs	2,027,044	1,970,595	-$4.12
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,031,103	-$4.12

Capital Asset Values:	Control	INSOL - NSP	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	Control	INSOL - NSP	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	167,707	137,713	$2.19
Finisher Diets	318,001	318,001	$0.00
Total Feed	750,430	720,436	$2.19

	Control	INSOL - NSP	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,235	718,235	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Control	INSOL - NSP
Operating Interest	22,820	22,288
Total Operating	1,309,378	1,278,852
Total Costs	2,027,613	1,997,087
	5 Year Average Feed Cost	
Gross Margin	778,174	752,251
Net Earnings	59,939	34,016
EBITDA	630,060	604,137
ROA	1.20%	0.68%
EBITDA/Sales	30.18%	29.74%
Net Earnings per Hog	$4.38	$2.48

Hog pool price/ckg	$140.00	$140.00
	Difference	($1.89)

ENTERPRISE RETURNS MODULE

Project 03-01

Revenues	Control	INSOL - NSP	Difference
Market Hogs	2,027,044	1,970,595	-$4.1
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	**2,087,552**	**2,031,103**	-$4.1

Capital Asset Values	Control	INSOL - NSP	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,009,338**	**5,009,338**	$0.00

Size of Operations (Sows)	Control	INSOL - NSP	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	167,707	137,713	$2.19
Finisher Diets	318,001	318,001	$0.00
Total Feed	750,430	720,436	$2.19

	Control	INSOL - NSP	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	**48,671**	**48,671**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
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Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	**718,235**	**718,235**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Control	INSOL - NSP
Operating Interest	22,820	22,288
Total Operating	1,309,378	1,278,852
Total Costs	2,027,613	1,997,087
	5 Year Average Feed Cost	
Gross Margin	778,174	752,251
Net Earnings	59,939	34,016
EBITDA	630,060	604,137
ROA	1.20%	0.68%
EBITDA/Sales	30.18%	29.74%
Net Earnings per Hog	$4.38	$2.48

Hog pool price/ckg	$140.00	$140.00

Difference ($1.89)

ENTERPRISE RETURNS MODULE

Project 03-01

Revenues:	Control	SOL - NSP	Difference
Market Hogs	2,027,044	1,969,967	-$4.17
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,030,476	-$4.17
Capital Asset Values:	Control	SOL - NSP	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00
Size of Operations (Sows)	Control	SOL - NSP	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	167,707	142,098	$1.87
Finisher Diets	318,001	318,001	$0.00
Total Feed	750,430	724,821	$1.87
	Control	SOL - NSP	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
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Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,235	718,235	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Control	SOL - NSP
Operating Interest	22,820	22,365
Total Operating	1,309,378	1,283,315
Total Costs	2,027,613	2,001,549
	5 Year Average Feed Cost	
Gross Margin	778,174	747,161
Net Earnings	59,939	28,927
EBITDA	630,060	599,048
ROA	1.20%	0.58%
EBITDA/Sales	30.18%	29.50%
Net Earnings per Hog	$4.38	$2.11

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.26)

ENTERPRISE RETURNS MODULE

Project 03-01

Revenues:	Control	SOL + INSOL - NSP	Difference
Market Hogs	2,027,044	1,762,428	-$19.33
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	1,822,936	-$19.33

Capital Asset Values:	Control	SOL + INSOL - NSP	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	Control	SOL + INSOL - NSP	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	167,707	118,182	$3.62
Finisher Diets	318,001	318,001	$0.00
Total Feed	750,430	700,905	$3.62

	Control	SOL + INSOL - NSP	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	182,883	182,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,235	718,235	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Control	SOL + INSOL - NSP
Operating Interest	22,820	21,941
Total Operating	1,309,378	1,258,975
Total Costs	2,027,613	1,977,210
	5 Year Average Feed Cost	
Gross Margin	778,174	563,961
Net Earnings	59,939	(154,274)
EBITDA	630,060	415,848
ROA	1.20%	-3.08%
EBITDA/Sales	30.18%	22.81%
Net Earnings per Hog	$4.38	($11.27)

Hog pool price/ckg	$140.00	$140.00
	Difference	($15.64)

ENTERPRISE RETURNS MODULE

Project 03-01

Revenues	Contro	SOL - NSP	Difference
Market Hog	2,027,044	1,969,967	-$4.1
Weaners/weanling			$0.0
Cull Sow	49,575	49,575	$0.0
Cull Boar	420	420	$0.0
Manure Sale	10,514	10,514	$0.0
			$0.0
Total Revenues	2,087,552	2,030,476	-$4.1
Capital Asset Values	Control	SOL - NSP	
Farrowing Facilities	1,766,885	1,766,885	$0.0
Nursery Facilities	815,826	815,826	$0.0
Grower Facilities	909,985	909,985	$0.0
Finisher Facilities	1,258,842	1,258,842	$0.0
Sows	244,000	244,000	$0.0
Boars	13,800	13,800	$0.0
Total Value of Assets	5,009,338	5,009,338	$0.0
Size of Operations (Sows)	Control	SOL - NSP	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.0
Nursery Diets	133,783	133,783	$0.0
Grower Diets	167,707	142,098	$1.8
Finisher Diets	318,001	318,001	$0.0
Total Feed	750,430	724,821	$1.8
	Control	SOL - NSP	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.0
Replacement Boars	6,900	6,900	$0.0
Veterinary, Medicine & Supplies	34,232	34,232	$0.0
Maintenenace & Repairs	49,568	49,568	$0.0
Utilities	88,047	88,047	$0.0
Office Supplies	3,423	3,423	$0.0
Marketing & Transportation	68,464	68,464	$0.0
AI Supplies	6,162	6,162	$0.0
Barn Supplies	20,539	20,539	$0.0
Management and Consulting Fees	21,635	21,635	$0.0
Other Misc Costs	685	685	$0.0
Total Misc & Supplies	404,575	404,575	$0.0
Labour:	82,883	82,883	$0.0
Manure Handling	31,226	31,226	$0.0
Water Consumption	17,445	17,445	$0.0
Water and Manure Handling:	48,671	48,671	$0.0
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.0
Interest and Deprec: Nursery	93,941	93,941	$0.0
Interest and Deprec: Grower	104,588	104,588	$0.0
Interest and Deprec: Finisher	144,891	144,891	$0.0
Management Salaries	94,723	94,723	$0.0
Insurance	53,390	53,390	$0.0
Property tax	15,747	15,747	$0.0
Total Fixed Costs	718,235	718,235	$0.0

5 Year Average Feed Cost		
Size of Operations (Sows)	Contro	SOL - NSP
Operating Interest	22,820	22,365
Total Operating	1,309,375	1,283,315
Total Costs	2,027,613	2,001,549
	5 Year Average Feed Cost	
Gross Margin	778,174	747,161
Net Earnings	59,939	28,927
EBITDA	630,060	599,048
ROA	1.20%	0.58%
EBITDA/Sales	30.18%	29.50%
Net Earnings per Hog	$4.38	$2.1

Hog pool price/ckg	$140.0	$140.0

Difference ($2.26

ENTERPRISE RETURNS MODULE

Project 03-01

Revenues:	Control	SOL + INSOL - NSP	Difference
Market Hogs	2,027,044	1,762,428	-$19.33
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	1,822,936	-$19.33

Capital Asset Values:	Control	SOL + INSOL - NSP	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	Control	SOL + INSOL - NSP	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	167,707	118,182	$3.62
Finisher Diets	318,001	318,001	$0.00
Total Feed	750,430	700,905	$3.62

	Control	SOL + INSOL - NSP	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
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Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,235	718,235	$0.00

5 Year Average Feed Cost

Size of Operations (Sows)	Control	SOL + INSOL - NSP
Operating Interest	22,820	21,941
Total Operating	1,309,378	1,258,975
Total Costs	2,027,613	1,977,210
	5 Year Average Feed Cost	
Gross Margin	778,174	563,961
Net Earnings	59,939	(154,274)
EBITDA	630,066	415,848
ROA	1.20%	-3.08%
EBITDA/Sales	30.18%	22.81%
Net Earnings per Hog	$4.31	($11.27)

Hog pool price/ckg	$140.00	$140.00

Difference: ($15.64)

The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery

A.D. Beaulieu, J.F. Patience, R.T. Zijlstra, and R. Mohr

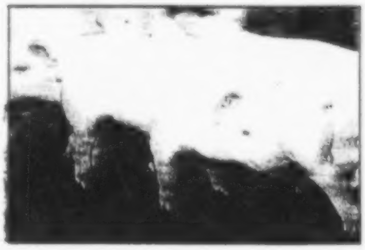
Summary

Variability in growth and performance is a concern to pork producers due to the associated negative impact on revenues and expenditures. This experiment was designed to determine the effect of starter program on the variability in animal weights at nursery exit. Treatments consisted of 4 starter programs, formulated and fed according to manufacturers' specifications from weaning (d 0) to nursery exit (d 50). Overall ADG was similar between programs, however, the ADFI differed thus, feed efficiency was affected by the program used. Variability in pig growth, determined as the coefficient of variation, was not affected by starter program. This was true regardless of the starting weight of the group of pigs. Therefore, although performance may be affected slightly by the use of a specific starter program, the change in performance is uniform across a group; and the variability in body weight at nursery exit will not be affected.

Introduction

Variability in growth and performance is a concern to pork producers due to the associated negative impact on revenues and expenditures. The challenge of reducing the impact of variability on pork production is a serious one and two options are available. The first is to reduce variability and the second is to manage it. If variability is considered to be excessive the implementation of management practices to reduce it will be a reasonable approach.

The starter program has the potential to influence the relative growth of individual pigs within a group by allowing the smaller and/or younger pigs to excel relative to the older and/or larger contemporaries. Variability will be reduced if the feeding regimen allows the smaller pigs to "catch-up" or meet the performance of the larger animals in their cohort. It is recognized that the subject of nursery diet impact on variability is complex; determining whether a feeding program can reduce the impact of variability was considered a first step.



Experimental Procedures

A total of 560 pigs were used in this experiment. This represented all the

Table 1. The effect of starter program on the performance of nursery pigs. The data were indexed to diet A which was arbitrarily assigned a value of 100.

	Treatment					
	A	B	C	D	Mean[a]	SEM[a]
Initial weight, kg	100.00	100.00	100.00	100.00	6.26	0.018
Final weight[b], kg	100.00	100.31	104.37	101.92	32.36	0.341
ADG, kg/d	100.00	100.00	103.15	102.95	0.52	0.008
ADFI[b], kg/d	100.00	99.31	105.82	105.13	0.74	0.009
FCE[b]	100.00	100.57	97.30	99.29	0.70	0.004
Feed cost/kg gain[b]	100.00	104.92	109.84	101.64	0.64	0.006
Feed cost/pig[b]	100.00	104.74	113.89	105.39	16.34	0.193

[a] Calculated from untransformed data

[b] Significant effect due to treatment ($P<0.05$)

Table 2. The effect of grouping by weaning weight on the performance of nursery pigs

	Weight Group				
	Lightest	Light	Heavy	Heaviest	SEM
Initial weight, kg	4.93	5.80	6.55	7.76	0.018
Final weight, kg	29.19	31.74	32.94	35.55	0.341
ADG, kg/d	0.479	0.519	0.521	0.545	0.008
ADFI, kg/d	0.665	0.730	0.756	0.800	0.009
FCE[a]	0.719	0.711	0.689	0.681	0.004
Feed cost/kg gain	0.64	0.63	0.64	0.64	0.006
Feed cost/pig[a]	15.29	16.24	16.49	17.33	0.193

[a] Significant effect of weight group ($P<0.05$)

Table 3. The effect of starter program on the coefficient of variation (CV, %) calculated from body weight[a] within pens. Pigs had been blocked by weight at weaning. The data were indexed to diet A which was arbitrarily assigned a value of 100

	Treatment					
Phase	A	B	C	D	Mean[b]	SEM[b]
d 4	100.00	98.77	101.97	95.08	8.05	0.42
d 7	100.00	89.81	97.98	92.04	8.94	0.65
d 20	100.00	91.37	94.34	95.21	13.13	1.16
d 34	100.00	104.43	83.14	97.59	12.39	0.84
d 50	100.00	94.13	85.43	99.36	10.33	0.68

[a] Calculated from pen data, averaged for each treatment. The overall CV for each nursery room averaged 17.8% at d 0 and 12.6% at d 50

[b] Calculated from untransformed data

Table 4. The effect of grouping by weaning weight on the coefficient of variation (CV, %) calculated from body weight[a].

	Weight Group				
Phase	Lightest	Light	Heavy	Heaviest	SEM
d 4[b]	8.13	8.03	8.29	7.73	0.42
d 7	9.42	8.46	9.23	8.67	0.65
d 20	13.79	12.60	13.01	13.13	1.16
d 34[b]	12.87	13.44	10.70	12.56	0.84
d 50[b]	10.91	10.27	9.32	10.84	0.68

[a] Calculated from pen data, averaged for each weight group. The overall CV for each nursery room averaged 17.8% at d 0 and 12.6% at d 50

[b] Significant effect due to weight group (P<0.05)

available pigs from two consecutive weeks of weaning at PSC Elstow Research Farm. The only pigs excluded from the experiment were those deemed to be suffering from an obvious medical or physical problem. The experimental group represents a typical and complete weaning group. Animals were blocked into one of 4 weight groups. The treatments consisted of 4 commercial programs currently in use in Western Canada. The feeding programs were fed according to the manufacturers' directions. The only restriction on the program was the medication, all diets were required to include LS20 at the recommended level.

Piglets were weighed individually when they were placed on test (d0) and on d4, d7, d13, d20, d34 and d50 (nursery exit). The CV was computed within a pen and analyzed as a variable across pens. To ensure confidentiality of participating companies, the performance data from one company was arbitrarily assigned a value of 100, and the data from the other companies is expressed relative to this. Significance was declared at the $P < 0.05$ level.

Results and Discussion.

Starter program had a modest effect on performance (Table 1). However, when examined within specific phases (data not shown), no specific program outperformed the others. There were no starter program by weight group interactions, meaning that a starter program did not elicit an improvement within specific weight groups. Feed cost per pig or per kg of gain did differ between feeding program. Feed costs were based on information provided by the collaborating feed companies and was intended to reflect the price charged to a customer for this program.

As mentioned above, the objective of this experiment was to determine if differences exist among commercial starter programs in terms of their impact on variability at nursery exit (not to determine the "best" commercial starter program, nor examine specific nutrients which impact pig growth during the nursery phase). Although weight group had an effect on CV at nursery exit, starter program had no effect on uniformity. Moreover, there were no interactions of starter program by weight group, implying that within a specific weight group, no starter program consistently improved uniformity.

Implications

Within every weaning group there are some very lightweight pigs. Uniformity at nursery exit will be improved if we can specifically increase the growth rate of these pigs. The effect of starter program was not specific for any

ENTERPRISE RETURNS MODULE

Project 03-02

Revenues	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)	Difference
Market Hogs	2,063,899	2,099,244	$2.54
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,159,899**	$2.54

Capital Asset Values:	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	210,465	-$0.83
Grower Diets	170,889	174,734	-$0.28
Finisher Diets	306,776	313,679	-$0.50
Total Feed	807,465	829,817	-$1.60
	57.92		

	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)
Operating Interest	23,909	24,306
Total Operating	1,371,902	1,394,650
Total Costs	2,092,418	2,115,166
	5 Year Average Feed Cost	
Gross Margin	752,652	765,249
Net Earnings	32,136	44,732
EBITDA	604,335	616,932
ROA	0.64%	0.89%
EBITDA/Sales	28.45%	28.56%
Net Earnings per Hog	$2.30	$2.21

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.90

ENTERPRISE RETURNS MODULE

Project 03-02

Revenues	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)	Difference
Market Hogs	2,063,899	2,047,354	-$1.19
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,108,009	-$1.19

Capital Asset Values:	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	191,586	$0.52
Grower Diets	170,889	169,180	$0.12
Finisher Diets	306,776	303,708	$0.22
Total Feed	807,465	795,414	$0.86
	57.92		

	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)
Operating Interest	23,909	23,695
Total Operating	1,371,902	1,359,637
Total Costs	2,092,418	2,080,153
	5 Year Average Feed Cost	
Gross Margin	752,652	748,373
Net Earnings	32,136	27,856
EBITDA	604,335	600,055
ROA	0.64%	0.56%
EBITDA/Sales	28.45%	28.47%
Net Earnings per Hog	$2.30	$2.00

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.31)

ENTERPRISE RETURNS MODULE

Project 03-02

Revenues	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)	Difference
Market Hogs	2,063,899	2,099,244	$2.54
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,159,899**	$2.54

Capital Asset Values	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	210,465	-$0.83
Grower Diets	170,889	174,734	-$0.28
Finisher Diets	306,776	313,679	-$0.50
Total Feed	807,465	829,817	-$1.60
	57.92		

	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Heaviest Pigs (7.5kg Wean Wt)
Operating Interest	23,909	24,306
Total Operating	1,371,902	1,394,650
Total Costs	2,092,418	2,115,166
		5 Year Average Feed Cost
Gross Margin	752,652	765,249
Net Earnings	32,136	44,732
EBITDA	604,335	616,932
ROA	0.64%	0.89%
EBITDA/Sales	28.45%	28.56%
Net Earnings per Hog	[illegible]	[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference [illegible]

ENTERPRISE RETURNS MODULE

Project 03-0

Revenues	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)	Difference
Market Hogs	2,063,899	2,047,354	-$1.19
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,108,009	-$1.19
Capital Asset Values:	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	191,586	$0.52
Grower Diets	170,889	169,180	$0.12
Finisher Diets	306,776	303,708	$0.22
Total Feed	807,465	795,414	$0.86
	57.92		
	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Light Pigs (5.8kg Wean Wt)
Operating Interest	23,909	23,695
Total Operating	1,371,902	1,359,637
Total Costs	2,092,418	2,080,153
	5 Year Average Feed Cost	
Gross Margin	752,652	748,373
Net Earnings	32,136	27,856
EBITDA	604,335	600,055
ROA	0.64%	0.56%
EBITDA/Sales	28.45%	28.47%
Net Earnings per Hog	$2.30	$2.00

Hog pool price/ckg	$140.00	$140.00

Difference $0.31

ENTERPRISE RETURNS MODULE

Project 03-02

Revenues:	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)	Difference
Market Hogs	2,063,899	1,982,862	-$5.81
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,043,517**	-$5.81

Capital Asset Values:	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	174,158	$1.77
Grower Diets	170,889	164,054	$0.49
Finisher Diets	306,776	294,505	$0.88
Total Feed	807,465	763,656	$3.14
	57.92		

	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)
Operating Interest	23,909	23,132
Total Operating	1,371,902	1,327,315
Total Costs	2,092,418	2,047,832
	5 Year Average Feed Cost	
Gross Margin	752,652	716,202
Net Earnings	32,136	(4,315)
EBITDA	604,335	567,885
ROA	0.64%	-0.09%
EBITDA/Sales	28.45%	27.79%
Net Earnings per Hog	$2.30	($0.31)

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.61)

ENTERPRISE RETURNS MODULE

Project 03-02

Revenues:	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)	Difference
Market Hogs	2,063,899	1,982,862	-$5.81
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,043,517**	-$5.81

Capital Asset Values:	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	174,158	$1.77
Grower Diets	170,889	164,054	$0.49
Finisher Diets	306,776	294,505	$0.88
Total Feed	807,465	763,656	$3.14
	57.92		

	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**482,883**	**482,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Heavy Pigs (6.6kg Wean Wt)	Lightest Pigs (4.9kg Wean Wt)
Operating Interest	23,909	23,132
Total Operating	1,371,902	1,327,315
Total Costs	2,092,418	2,047,832
	5 Year Average Feed Cost	
Gross Margin	752,652	716,202
Net Earnings	32,136	(4,315)
EBITDA	604,335	567,885
ROA	0.64%	-0.09%
EBITDA/Sales	28.45%	27.79%
Net Earnings per Hog	$2.30	($0.31)

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.61)

Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola Meal

R.T. Zijlstra[1], D.R. Hickling[2], and J.F. Patience[1]

Summary

A sample of either mustard meal (Brassica juncea) or regular canola meal was included at 15% in diets fed to grower pigs for 28 days. Pigs fed mustard meal tended to have a 5% better growth performance and had a 2.5%-unit better feed efficiency and an equal feed intake than pigs fed canola meal. Mustard meal might thus be a good opportunity ingredient with minimally a nutritional value equal as canola meal.

Introduction

Mustard meal might be a valuable ingredient for the swine industry domestically and internationally. In some export markets, concerns exist regarding the voluntary feed intake of pigs fed mustard instead of canola meal in their diets. This study therefore compared two diets with either mustard meal or canola meal in the diet at a 15% inclusion rate, which is an inclusion rate that should allow to assess if the feed intake concerns are indeed valid, or not and if growth performance differences exist.

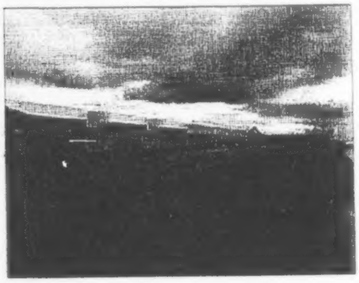


Table 1. Analyzed nutrient content of mustard and canola meal

Nutrient, % as fed	Mustard Meal	Canola Meal
Moisture	7.2	9.9
Ash	7.3	7.0
Crude Protein	42.4	39.0
Acid Detergent fibre	11.4	17.0
Neutral detergent fibre	18.8	27.8
Crude fibre	7.7	11.4
Crude fat	1.4	2.5

Experimental Procedures

A diet containing 15% canola meal was formulated based on 48% corn, 17% soybean meal and 15% wheat was formulated to 3.45 Mcal DE/kg and 2.60 g apparent digestible lysine/ Mcal DE. Replacing canola meal 1:1 with mustard meal created a diet containing 15% mustard meal. The pelleted diets were each fed for 28 days to grower pigs housed 5 pigs per pen.

Results and Discussion

The standard chemical characteristics of mustard meal and canola meal are listed in Table 1.

For each of the four weeks of the experiment, voluntary or average daily feed intake of the grower pigs increased gradually, and differences in voluntary feed intake were not observed between pigs fed mustard meal or canola meal (Table 2).

For the first three weeks of the experiment, average daily gain and feed efficiency did not differ statistically between pigs fed mustard meal or canola meal ($P > 0.10$). However, pigs fed mustard meal grew 17% more and had a 6-% unit higher feed efficiency during the last week of the experiment ($P < 0.05$), resulting in an overall tendency for pigs fed mustard meal to grow faster than pigs fed canola meal.

Based on these results for feed intake and gain, mustard meal had a higher content of digestible nutrients than canola meal.

Table 2. Voluntary feed intake and growth performance of grower pigs fed either mustard or canola meal

Variable	Mustard Meal	Canola Meal
Average daily fed intake (g/d)		
Day 1-7	1,744	1.780
Day 8-14	1,892	1,937
Day 15-21	1,960	1,979
Day 22-28	2,163	2.129
Total: Day 1-28	1,940	1,956
Average daily gain (g/d)		
Day 1-7	981	1.001
Day 8-14	861	872
Day 15-21	947	889
Day 22-28	964^a	825^b
Total: Day 1-28	939^A	897^B
Feed efficiency (%)		
Day 1-7	55.9	56.3
Day 8-14	45.4	44.9
Day 15-21	48.4	45.4
Day 22-28	44.6^a	38.8^b
Total: Day 1-28	48.5^a	46.0^b

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[1] Prairie Swine Centre Inc. Saskatoon, SK. [2] Canola Council of Canada, Winnipeg, MB

ENTERPRISE RETURNS MODULE

Project 03-03

Revenues:	Canola Mea	Mustard Mea	Difference
Market Hogs	2,063,899	2,080,049	$1.16
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,140,703	$1.16

Capital Asset Values:	Canola Meal	Mustard Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Canola Meal	Mustard Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	169,669	$0.09
Finisher Diets	306,776	306,776	$0.00
Total Feed	807,465	806,245	$0.09
	57.92		

	Canola Meal	Mustard Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplie	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Canola Meal	Mustard Meal
Operating Interest	23,909	23,888
Total Operating	1,371,902	1,370,660
Total Costs	2,092,418	2,091,177
	5 Year Average Feed Cost	
Gross Margin	752,652	770,043
Net Earnings	32,136	49,526
EBITDA	604,335	621,726
ROA	0.64%	0.99%
EBITDA/Sales	28.45%	29.04%
Net Earnings per Hog	$2.30	$2.51

Hog pool price/ckg	$140.00	$140.00

Difference $1.247

ENTERPRISE RETURNS MODULE

Project 03-03

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Market Hogs	2,063,899	2,080,049	$1.16
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Cull Sows	49,575	49,575	$0.00
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Sows	244,000	244,000	$0.00
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Total Feed	807,465	806,245	$0.09
	57.92		

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EBITDA	604,335	621,726
ROA	0.64%	0.99%
EBITDA/Sales	28.45%	29.04%
Net Earnings per Hog	$2.30	$2.55

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.2474

Electronic Sow Feeder: A Preliminary Report

Y. Li and H.W. Gonyou

Introduction

One of the more controversial aspects of pig production is the housing of gestating sows. Gestation stalls have been identified as one of the three most restrictive practices, along with battery cages for hens and crates for veal calves, throughout the history of the modern animal welfare movement. As a result, there is considerable interest in group housing systems for gestating sows. There are at least four major group housing systems, with several management options within each, that are available to the industry. We have selected the electronic sow feeder (ESF) system as a group system for PSC Elstow Research Farm, and are examining a number of management options within that system.

Experimental Procedures

Approximately half of the 600-sow herd is now on electronic sow feeders in which each animal passes through a feeding station to obtain her daily feed allotment. Our system currently operates on partially slatted floors without bedding. We are studying social management of the groups in order to identify and correct problems with specific age classes. We have housed gilts with older sows even though we recognize this may result in some problems. However, our belief is that a combined gilt/sow program would be easier for producers if we can resolve the problems. Similarly, we recognize that first parity animals may also be at risk in groups. We are comparing:

1. The productivity and behaviour of gilts and sows of different parities.
2. The relative benefits of grouping animals shortly after breeding (pre-implantation) or after implantation (at 7 weeks; 'add-in'), and its interaction with parity.
3. The management of animals in static (45 sows) and large (135 sows) dynamic groups.
4. All electronic sow feeder groups are compared with animals managed in conventional stalls.

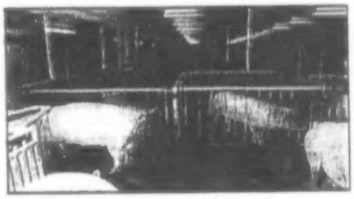
The results of the first three reproductive cycles (60 weeks of breedings) have been summarized and presented in table 1. The values presented represent live piglets born per 100 animals bred. This is a combination of farrowing rate and live litter size. The 'Adjusted' values represent a herd comprised of 25% gilts, 25% 1st parity, and 50% older sows. These results are only preliminary as they represent a limited number of animals in each category.

Table 1. Productivity (live piglets/100 females bred) of gilts and sows in Stalls and various management programs within an Electronic Sow Feeder system.

	Stall	Static	Dynamic	Add-in-Static	Add-in-Dynamic
Gilt	771	633	739	762	776
1st Parity	930	872	794	967	942
Mature	983	932	907	1,059	998
Adjusted[1]	917	842	837	962	929

[1] Based on a herd comprised of 25% gilts, 25% 1st parity, and 50% mature sows.

Productivity increased from gilts to 1st parity to older sows as expected in both ESF and stall systems. However, the younger animals tended to perform better in stalls, and the older sows better in ESF. There was considerable variation in performance of age groups in the different electronic sow feeder management systems.



The 'add-in' or post-implantation animals performed better (945) than those grouped shortly after breeding (840). Somewhat surprisingly, all parity groups performed much better as add-ins than when re-grouped early.

The Static program (combined pre and post-implant, 902) outperformed the Dynamic (883). However, gilts did relatively poorly in the Static system (698) but fairly well in Dynamic (758). The older animals (including 'add-ins') did better in the Static program.

Overall, the stall system (917) outperformed the electronic sow feeder system (892), but this was not the case for all electronic sow feeder management programs. The Add-In (945) animals in electronic sow feeders (both programs combined) produced more piglets than did the Stall animals (917). The post-implant static program for electronic sow feeders outperformed the stalls by 5%. The 'add-in' static gilts performed about as well as those in stalls, but the 1st parity animals and sows exceeded those in stalls by 4% and 8%, respectively.

As we continue this study we will be including behavioural and physiological observations. We are also collecting data on injuries, lesions, and mortality throughout the six cycles.

Implications

The electronic sow feeder system can

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Project 03-04

Revenues	Stall Housing	Add-in-Static Housing	Difference
Market Hogs	1,931,220	1,957,018	$0.00
Weaners/weanings			$0.00
Cull Sows	49,575	49,575	-$0.05
Cull Boars	420	420	$0.00
Manure Sales	10,134	10,236	$0.00
			$0.00
Total Revenues	**1,991,348**	**2,017,249**	-$0.05

Capital Asset Values:	Stall Housing	Add-in-Static Housing	
Farrowing Facilities	1,766,885	1,766,885	$1.79
Nuresery Facilities	815,826	815,826	$0.82
Grower Facilities	909,985	909,985	$0.92
Finisher Facilities	1,258,842	1,258,842	$1.27
Sows	244,000	244,000	$0.25
Boars	13,800	13,800	$0.01
Total Value of Assets	**5,009,338**	**5,009,338**	$5.06

Size of Operations (Sows)	Stall Housing	Add-in-Static Housing	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.13
Nursery Diets	127,459	129,161	$0.00
Grower Diets	159,903	162,040	$0.00
Finisher Diets	302,968	307,016	$0.00
Total Feed	721,269	729,155	$0.13

	Stall Housing	Add-in-Static Housing	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.11
Replacement Boars	6,900	6,900	$0.01
Veterinary, Medicine & Supplies	32,614	33,050	$0.00
Maintenenace & Repairs	47,225	47,856	$0.00
Utilities	88,047	88,047	$0.09
Office Supplies	3,261	3,305	$0.00
Marketing & Transportation	65,228	66,099	$0.00
AI Supplies	5,871	5,949	$0.00
Barn Supplies	19,568	19,830	$0.00
Management and Consulting Fees	20,612	20,887	$0.00
Other Misc Costs	652	661	$0.00
Total Misc & Supplies	**394,898**	**397,503**	$0.20
Labour:	**82,883**	**88,803**	-$0.36
Manure Handling	30,098	30,401	$0.01
Water Consumption	16,813	16,983	$0.00
Water and Manure Handling:	**46,911**	**47,384**	$0.01

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.21
Interest and Deprec: Nursery	93,941	93,941	$0.09
Interest and Deprec: Grower	104,588	104,588	$0.11
Interest and Deprec: Finisher	144,891	144,891	$0.15
Management Salaries	94,723	94,723	$0.10
Insurance	53,043	53,136	$0.05
Property tax	15,002	15,203	$0.00
Total Fixed Costs	717,143	717,437	$0.70

	5 Year Average Feed Cost	
Size of Operations (Sows)	Stall Housing	Add-in-Static Housing
Operating Interest	22,099	22,399
Total Operating	1,268,060	1,285,245
Total Costs	1,985,203	2,002,682
	5 Year Average Feed Cost	
Gross Margin	723,288	732,004
Net Earnings	6,146	14,568
EBITDA	575,522	584,145
ROA -	0.12%	0.29%
EBITDA/Sales	28.90%	28.96%
Net Earnings per Hog	$0.47	$1.10

Hog pool price/ckg	$140.00	$140.00

Difference $0.63

ENTERPRISE RETURNS MODULE

Project 03-04

Revenues	Stall Housing	Dynamic Housing	Difference
Market Hogs	1,931,220	2,025,201	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	-$0.18
Cull Boars	420	420	$0.00
Manure Sales	10,134	10,506	-$0.01
			$0.00
Total Revenues	1,991,848	2,085,702	-$0.19

Capital Asset Values:	Stall Housing	Dynamic Housing	
Farrowing Facilities	1,766,885	1,766,885	$6.25
Nuresery Facilities	815,826	815,826	$2.90
Grower Facilities	909,985	909,985	$3.24
Finisher Facilities	1,258,842	1,258,842	$4.48
Sows	244,000	244,000	$0.87
Boars	13,800	13,800	$0.05
Total Value of Assets	5,009,338	5,009,338	$17.82

Size of Operations (Sows)	Stall Housing	Dynamic Housing	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.47
Nursery Diets	127,459	133,661	$0.00
Grower Diets	159,903	167,685	$0.00
Finisher Diets	302,968	317,712	$0.00
Total Feed	721,269	749,997	$0.47

	Stall Housing	Dynamic Housing	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.37
Replacement Boars	6,900	6,900	$0.02
Veterinary, Medicine & Supplies	32,614	34,201	$0.00
Maintenenace & Repairs	47,225	49,523	$0.00
Utilities	88,047	88,047	$0.31
Office Supplies	3,261	3,420	$0.00
Marketing & Transportation	65,228	68,402	$0.00
AI Supplies	5,871	6,156	$0.00
Barn Supplies	19,568	20,521	$0.00
Management and Consulting Fees	20,612	21,615	$0.00
Other Misc Costs	652	684	$0.00
Total Misc & Supplies	394,898	404,389	$0.71
Labour:	82,883	88,803	-$0.14
Manure Handling	30,098	31,204	$0.03
Water Consumption	16,813	17,432	$0.01
Water and Manure Handling:	46,911	48,637	$0.04
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.75
Interest and Deprec: Nursery	93,941	93,941	$0.33
Interest and Deprec: Grower	104,588	104,588	$0.37
Interest and Deprec: Finisher	144,891	144,891	$0.52
Management Salaries	94,723	94,723	$0.34
Insurance	53,043	53,384	$0.16
Property tax	15,002	15,732	$0.00
Total Fixed Costs	717,143	718,214	$2.47

5 Year Average Feed Cost		
Size of Operations (Sows)	Stall Housing	Dynamic Housing
Operating Interest	22,099	22,913
Total Operating	1,268,060	1,314,739
Total Costs	1,985,203	2,032,953
	5 Year Average Feed Cost	
Gross Margin	723,288	770,963
Net Earnings	6,146	52,749
EBITDA	575,522	622,856
ROA	0.12%	1.05%
EBITDA/Sales	28.90%	29.86%
Net Earnings per Hog	$0.47	$3.86

Hog pool price/ckg	$140.00	$140.00
	Difference	$3.38

ENTERPRISE RETURNS MODULE

Project 03-04

Revenues	Stall Housing	Add-in-Static Housing	Difference
Market hog	1,931,220	1,957,018	$0.0
Weaners/weaning			$0.0
Cull Sows	49,575	49,573	-$0.0
Cull Boars	420	420	$0.0
Manure Sales	10,134	10,236	$0.00
			$0.0
Total Revenues	1,991,348	2,017,249	-$0.0

Capital Asset Values	Stall Housing	Add-in-Static Housing	
Farrowing Fabilities	1,766,885	1,766,885	$1.79
Nureserv Facilities	815,826	815,826	$0.82
Grower Facilities	909,985	909,985	$0.92
Finisher Facilities	1,258,842	1,258,842	$1.27
Sows	244,000	244,000	$0.25
Boars	13,800	13,800	$0.01
Total Value of Assets	5,009,338	5,009,338	$5.0

Size of Operations (Sows)	Stall Housing	Add-in-Static Housing	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.13
Nursery Diets	127,459	129,161	$0.00
Grower Diets	159,903	162,040	$0.04
Finisher Diets	302,968	307,016	$0.0
Total Feed	721,269	729,155	$0.13

	Stall Housing	Add-in-Static Housing	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.11
Replacement Boars	6,900	6,900	$0.01
Veterinary, Medicine & Supplies	32,614	33,050	$0.0
Maintenenace & Repairs	47,225	47,856	$0.0
Utilities	88,047	88,047	$0.09
Office Supplies	3,261	3,305	$0.00
Marketing & Transportation	65,228	66,099	$0.00
AI Supplies	5,871	5,949	$0.00
Barn Supplies	19,568	19,830	$0.00
Management and Consulting Fees	20,612	20,887	$0.00
Other Misc Costs	652	661	$0.00
Total Misc& Supplies	394,898	397,503	$0.2
Labour:	82,883	88,803	-$0.3
Manure Handling	30,098	30,401	$0.0
Water Consumption	16,813	16,983	$0.00
Waterand Manure Handling:	46,911	47,384	$0.0
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.2
Interest and Deprec: Nursery	93,941	93,941	$0.09
Interest and Deprec: Grower	104,588	104,588	$0.11
Interest and Deprec: Finisher	144,891	144,891	$0.1
Management Salaries	94,723	94,723	$0.1
Insurance	53,043	53,136	$0.0
Property tax	15,002	15,203	$0.0
Total Fixed Costs	717,143	717,437	$0.7

5 Year Average Feed Cost		
Size of Operations (Sows)	Stall Housing	Add-in-Static Housing
Operating Interest	22,099	22,399
Total Operating	1,268,060	1,285,245
Total Costs	1,985,203	2,002,682
	5 Year Average Feed Cost	
Gross Margin	723,288	732,004
Net Earnings	6,146	14,568
EBITDA	575,522	584,145
ROA	0.12%	0.29%
EBITDA/Sales	28.90%	28.96%
Net Earnings per hog	$0.4	$1.1

Hog pool price/ckg	$140.00	$140.00

Difference $0.6

ENTERPRISE RETURNS MODULE

Project [illegible]

Revenues	Stall Housing	Dynamic Housing	Difference
Market Hogs	1,931,220	2,025,201	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	-$0.18
Cull Boars	420	420	$0.00
Manure Sales	10,134	10,506	-$0.01
			$0.00
Total Revenues	1,991,348	2,085,702	-$0.19

Capital Asset Values	Stall Housing	Dynamic Housing	
Farrowing Facilities	1,766,885	1,766,885	$6.29
Nursery Facilities	815,826	815,826	$2.90
Grower Facilities	909,985	909,985	$3.24
Finisher Facilities	1,258,842	1,258,842	$4.48
Sows	244,000	244,000	$0.87
Boars	13,800	13,800	$0.05
Total Value of Assets	5,009,338	5,009,338	$17.82

Size of Operations (Sows)	Stall Housing	Dynamic Housing	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.47
Nursery Diets	127,459	133,661	$0.00
Grower Diets	159,903	167,685	$0.00
Finisher Diets	302,968	317,712	$0.00
Total Feed	721,269	749,997	$0.47

	Stall Housing	Dynamic Housing	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.37
Replacement Boars	6,900	6,900	$0.02
Veterinary, Medicine & Supplies	32,614	34,201	$0.00
Maintenenace & Repairs	47,225	49,523	$0.00
Utilities	88,047	88,047	$0.31
Office Supplies	3,261	3,420	$0.00
Marketing & Transportation	65,228	68,403	$0.00
AI Supplies	5,871	6,156	$0.00
Barn Supplies	19,568	20,521	$0.60
Management and Consulting Fees	20,612	21,615	$0.00
Other Misc Costs	652	684	$0.00
Total Misc & Supplies	394,898	404,389	$0.71
Labour:	82,883	88,803	-$0.14
Manure Handling	30,098	31,204	$0.03
Water Consumption	16,813	17,432	$0.01
Water and Manure Handling:	46,911	48,637	$0.04
Fixed Costs:			
Interest and Deprec. Farrowing	210,955	210,955	$0.75
Interest and Deprec. Nursery	93,941	93,941	$0.33
Interest and Deprec. Grower	104,588	104,588	$0.37
Interest and Deprec. Finisher	144,891	144,891	$0.52
Management Salaries	94,723	94,723	$0.34
Insurance	53,043	53,384	$0.16
Property tax	15,002	15,732	$0.00
Total Fixed Costs	717,143	718,214	$2.47

5 Year Average Feed Cost		
Size of Operations (Sows)	Stall Housing	Dynamic Housing
Operating Interest	22,094	22,913
Total Operating	1,268,060	1,314,739
Total Costs	1,985,203	2,032,953
	5 Year Average Feed Cost	
Gross Margin	723,288	770,963
Net Earnings	6,146	52,749
EBITDA	575,522	622,856
ROA	0.12%	1.05%
EBITDA/Sales	28.90%	29.86%
Net Earnings per Hog	$0.43	$3.80

Hog pool price/ckg	$140.00	$140.00

Difference $3.38

ENTERPRISE RETURNS MODULE

Project 03-04

Revenues	Stall Housing	Static Housing	Difference
Market Hogs	1,931,220	1,772,742	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.34
Cull Boars	420	420	$0.00
Manure Sales	10,134	9,505	$0.02
			$0.00
Total Revenues	**1,991,348**	**1,832,242**	$0.36
Capital Asset Values:	**Stall Housing**	**Static Housing**	
Farrowing Facilities	1,766,885	1,766,885	-$12.11
Nuresery Facilities	815,826	815,826	-$5.59
Grower Facilities	909,985	909,985	-$6.24
Finisher Facilities	1,258,842	1,258,842	-$8.63
Sows	244,000	244,000	-$1.67
Boars	13,800	13,800	-$0.09
Total Value of Assets	**5,009,338**	**5,009,338**	-$34.33
Size of Operations (Sows)	**Stall Housing**	**Static Housing**	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	-$0.90
Nursery Diets	127,459	116,999	$0.00
Grower Diets	159,903	146,782	$0.00
Finisher Diets	302,968	278,106	$0.00
Total Feed	721,269	672,826	-$0.90
	Stall Housing	**Static Housing**	
Misc. Costs:			
Replacement Gilts	104,920	104,920	-$0.72
Replacement Boars	6,900	6,900	-$0.05
Veterinary, Medicine & Supplies	32,614	29,938	$0.00
Maintenenace & Repairs	47,225	43,350	$0.00
Utilities	88,047	88,047	-$0.60
Office Supplies	3,261	2,994	$0.00
Marketing & Transportation	65,228	59,875	$0.00
AI Supplies	5,871	5,389	$0.00
Barn Supplies	19,568	17,963	$0.00
Management and Consulting Fees	20,612	18,921	$0.00
Other Misc Costs	652	599	$0.00
Total Misc & Supplies	**394,898**	**378,893**	-$1.37
Labour:	**82,883**	**87,145**	-$0.92
Manure Handling	30,098	28,231	-$0.05
Water Consumption	16,813	15,769	-$0.03
Water and Manure Handling:	**46,911**	**44,000**	-$0.08
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	-$1.45
Interest and Deprec: Nursery	93,941	93,941	-$0.64
Interest and Deprec: Grower	104,588	104,588	-$0.72
Interest and Deprec: Finisher	144,891	144,891	-$0.99
Management Salaries	94,723	94,723	-$0.65
Insurance	53,043	52,467	-$0.32
Property tax	15,002	13,771	$0.00
Total Fixed Costs	**717,143**	**715,336**	-$4.76

	5 Year Average Feed Cost	
Size of Operations (Sows)	Stall Housing	Static Housing
Operating Interest	22,099	20,980
Total Operating	1,268,060	1,203,845
Total Costs	1,985,203	1,919,181
	5 Year Average Feed Cost	
Gross Margin	723,288	628,397
Net Earnings	6,146	(86,939
EBITDA	575,522	481,206
ROA	0.12%	-1.74%
EBITDA/Sales	28.90%	26.26%
Net Earnings per Hog	$0.47	($7.26)

Hog pool price/ckg	$140.00	$140.00
	Difference	($7.73)

ENTERPRISE RETURNS MODULE

Project 03-04

Revenues	Stall Housing	Dynamic Housing	Difference
Market Hogs	1,931,220	1,763,528	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.36
Cull Boars	420	420	$0.00
Manure Sales	10,134	9,469	$0.02
			$0.00
Total Revenues	1,991,348	1,822,992	$0.38

Capital Asset Values:	Stall Housing	Dynamic Housing	
Farrowing Facilities	1,766,885	1,766,885	-$12.88
Nureserv Facilities	815,826	815,826	-$5.95
Grower Facilities	909,985	909,985	-$6.63
Finisher Facilities	1,258,842	1,258,842	-$9.18
Sows	244,000	244,000	-$1.78
Boars	13,800	13,800	-$0.10
Total Value of Assets	5,009,338	5,009,338	-$36.51

Size of Operations (Sows)	Stall Housing	Dynamic Housing	
	5 Year Average Feed Cost		
Feed: Average Feed Costs			
Sow and Boar Diets	130,939	130,939	-$0.95
Nursery Diets	127,459	116,391	$0.00
Grower Diets	159,903	146,019	$0.00
Finisher Diets	302,968	276,661	$0.00
Total Feed	721,269	670,010	-$0.95

	Stall Housing	Dynamic Housing	
Misc. Costs:			
Replacement Gilts	104,920	104,920	-$0.76
Replacement Boars	6,900	6,900	-$0.05
Veterinary, Medicine & Supplies	32,614	29,782	$0.00
Maintenenace & Repairs	47,225	43,124	$0.00
Utilities	88,047	88,047	-$0.64
Office Supplies	3,261	2,978	$0.00
Marketing & Transportation	65,228	59,564	$0.00
AI Supplies	5,871	5,361	$0.00
Barn Supplies	19,568	17,869	$0.00
Management and Consulting Fees	20,612	18,822	$0.00
Other Misc Costs	652	596	$0.00
Total Misc & Supplies	394,898	377,963	-$1.46
Labour:	82,883	87,145	-$0.96
Manure Handling	30,098	28,123	-$0.05
Water Consumption	16,813	15,708	-$0.03
Water and Manure Handling:	46,911	43,831	-$0.08
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	-$1.54
Interest and Deprec: Nursery	93,941	93,941	-$0.68
Interest and Deprec: Grower	104,588	104,588	-$0.76
Interest and Deprec: Finisher	144,891	144,891	-$1.06
Management Salaries	94,723	94,723	-$0.69
Insurance	53,043	52,434	-$0.34
Property tax	15,002	13,700	$0.00
Total Fixed Costs	717,143	715,231	-$5.07

5 Year Average Feed Cost		
Size of Operations (Sows)	Stall Housing	Dynamic Housing
Operating Interest	22,099	20,911
Total Operating	1,268,060	1,199,860
Total Costs	1,985,203	1,915,091
	5 Year Average Feed Cost	
Gross Margin	723,288	623,132
Net Earnings	6,146	(92,099)
EBITDA	575,522	475,975
ROA	0.12%	-1.84%
EBITDA/Sales	28.90%	26.11%
Net Earnings per Hog	$0.47	($7.73)

Hog pool price/ckg	$140.00	$140.00
	Difference	($8.20)

ENTERPRISE RETURNS MODULE

Project 03-04

Revenues:	Stall Housing	Static Housing	Difference
Market Hogs	1,931,220	1,772,742	$0.01
Weaners/weanlings			$0.0
Cull Sows	49,575	49,575	$0.34
Cull Boars	420	420	$0.00
Manure Sales	10,134	9,505	$0.02
			$0.0
Total Revenues	1,991,348	1,832,242	$0.36
Capital Asset Values	Stall Housing	Static Housing	
Farrowing Facilities	1,766,885	1,766,885	-$12.11
Nuresery Facilities	815,826	815,826	-$5.54
Grower Facilities	909,985	909,985	-$6.24
Finisher Facilities	1,258,842	1,258,842	-$8.63
Sows	244,000	244,000	-$1.67
Boars	13,800	13,800	-$0.09
Total Value of Assets	5,009,338	5,009,338	-$34.33
Size of Operations (Sows)	Stall Housing	Static Housing	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	-$0.90
Nursery Diets	127,459	116,999	$0.00
Grower Diets	159,903	146,782	$0.00
Finisher Diets	302,968	278,106	$0.00
Total Feed	721,269	672,826	-$0.90
	Stall Housing	Static Housing	
Misc. Costs:			
Replacement Gilts	104,920	104,920	-$0.72
Replacement Boars	6,900	6,900	-$0.05
Veterinary, Medicine & Supplies	32,614	29,938	$0.00
Maintenenace & Repairs	47,225	43,350	$0.00
Utilities	88,047	88,047	-$0.60
Office Supplies	3,261	2,994	$0.00
Marketing & Transportation	65,228	59,875	$0.00
AI Supplies	5,871	5,389	$0.00
Barn Supplies	19,568	17,963	$0.00
Management and Consulting Fees	20,612	18,921	$0.00
Other Misc Costs	652	599	$0.00
Total Misc & Supplies	394,898	378,893	-$1.37
Labour:	82,883	87,145	-$0.92
Manure Handling	30,098	28,231	-$0.05
Water Consumption	16,813	15,769	-$0.03
Water and Manure Handling:	46,911	44,000	-$0.08
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	-$1.45
Interest and Deprec: Nursery	93,941	93,941	-$0.64
Interest and Deprec: Grower	104,586	104,588	-$0.72
Interest and Deprec: Finisher	144,891	144,891	-$0.99
Management Salaries	94,723	94,723	-$0.65
Insurance	53,043	52,467	-$0.32
Property tax	15,002	13,771	$0.0
Total Fixed Costs	717,143	715,336	-$4.7

5 Year Average Feed Cost		
Size of Operations (Sows)	Stall Housing	Static Housing
Operating Interest	22,099	20,980
Total Operating	1,268,060	1,203,845
Total Costs	1,985,203	1,919,181
	5 Year Average Feed Cost	
Gross Margin	723,288	628,397
Net Earnings	6,146	(86,939)
EBITDA	575,522	481,206
ROA	0.12%	-1.74%
EBITDA/Sales	28.90%	26.26%
Net Earnings per Hog	$0.47	($7.26)

Hog pool price/ckg	$140.00	$140.00

Difference ($7.7

ENTERPRISE RETURNS MODULE

Revenues	Stall Housing	Dynamic Housing	Difference
Market Hogs	1,931,220	1,763,528	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.36
Cull Boars	420	420	$0.00
Manure Sales	10,134	9,469	$0.02
			$0.00
Total Revenues	1,991,348	1,822,992	$0.38

Capital Asset Values:	Stall Housing	Dynamic Housing	
Farrowing Facilities	1,766,885	1,766,885	-$12.88
Nureserv Facilities	815,826	815,826	-$5.95
Grower Facilities	909,985	909,985	-$6.63
Finisher Facilities	1,258,842	1,258,842	-$9.18
Sows	244,000	244,000	-$1.78
Boars	13,800	13,800	-$0.10
Total Value of Assets	5,009,338	5,009,338	-$36.51

Size of Operations (Sows)	Stall Housing	Dynamic Housing	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	-$0.95
Nursery Diets	127,459	116,391	$0.00
Grower Diets	159,903	146,019	$0.00
Finisher Diets	302,968	276,661	$0.00
Total Feed	721,269	670,010	-$0.95

	Stall Housing	Dynamic Housing	
Misc. Costs:			
Replacement Gilts	104,920	104,920	-$0.76
Replacement Boars	6,900	6,900	-$0.05
Veterinary, Medicine & Supplies	32,614	29,782	$0.00
Maintenenace & Repairs	47,225	43,124	$0.00
Utilities	88,047	88,047	-$0.64
Office Supplies	3,261	2,978	$0.00
Marketing & Transportation	65,228	59,564	$0.00
AI Supplies	5,871	5,361	$0.00
Barn Supplies	19,568	17,869	$0.00
Management and Consulting Fees	20,612	18,822	$0.00
Other Misc Costs	652	596	$0.00
Total Misc & Supplies	394,898	377,963	-$1.46
Labour:	82,883	87,145	-$0.96
Manure Handling	30,098	28,123	-$0.05
Water Consumption	16,813	15,708	-$0.03
Water and Manure Handling:	46,911	43,831	-$0.08
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	-$1.54
Interest and Deprec: Nursery	93,941	93,941	-$0.68
Interest and Deprec: Grower	104,588	104,588	-$0.76
Interest and Deprec: Finisher	144,891	144,891	-$1.06
Management Salaries	94,723	94,723	-$0.69
Insurance	53,043	52,434	-$0.34
Property tax	15,002	13,700	$0.00
Total Fixed Costs	717,143	715,231	-$5.07

5 Year Average Feed Cost		
Size of Operations (Sows)	Stall Housing	Dynamic Housing
Operating Interest	22,099	20,911
Total Operating	1,268,060	1,199,860
Total Costs	1,985,203	1,915,091
	5 Year Average Feed Cost	
Gross Margin	723,288	623,132
Net Earnings	6,146	(92,099)
EBITDA	575,522	475,975
ROA	0.12%	-1.84%
EBITDA/Sales	28.90%	26.11%
Net Earnings per Hog	$0.47	($7.73)

Hog pool price/ckg	$140.00	$140.00
	Difference	($8.20)

Water Usage by Grower-Finisher Pigs Using Dry and Wet/Dry Feeders

Shala Christianson [1], Stephane Lemay, Claude Lague [2], John Patience, and Harold Gonyou

Summary

Water conservation is a growing concern in intensive swine operations (ISOs) for both financial and environmental reasons. The water usage of a grower-finisher room in an ISO was measured using dry and wet/dry feeders. The major source and sink of water was at the drinker and in the manure, respectively. In addition, water disappearance and manure volume were reduced from 9.3 to 6.2 and from 8.9 to 5.4 kg water/pig-day, respectively, when wet/dry feeders were used in place of dry feeders. Therefore, wet/dry feeders are an effective alternative for reducing water usage and manure volume of grower-finisher barns.

Pig performance was not significantly different for dry and wet/dry feeders (p>0.05), although by the end of the finisher phase, the pigs on wet/dry feeders were generally 5% larger than the pigs on the dry feeders. The feed conversions (FC) were similar for pigs on both dry and wet/dry feeders, with the FC being slightly higher for pigs on wet/dry feeders.

Wet dry feeders reduced water disappearance by 34% and volume of slurry by 29%.

Implications

Future research on water conservation in an ISO should focus on the drinker and on the manure. Use of wet/dry feeders versus dry feeders generally resulted in less water being used and less manure to handle, decreasing the water usage and storage and handling costs.

Acknowledgements

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Introduction

To address water conservation in intensive swine operations, the significant sources and sinks of water (water balance) need to be identified to know where to focus research efforts. Previous studies have shown that use of wet/dry feeders in place of dry feeders has potential water savings. The objective of this study was to systematically measure and report the water usage of grower-finisher swine using dry and wet/dry feeders.

Experimental Procedures

Six separate grower-finisher cycles were followed and the parameters of water usage, including water from the drinkers, in the feed, metabolic reactions within the pig, ventilated from the room and in the manure, were measured for each cycle.

Results and Discussion

Table 1 presents a summary of the average values for the water balance measured over the six cycles. The significant source and sink of water was at the drinker, at 72% of the total water source, and in the slurry, at 64% of the total water sink, respectively. The use of wet/dry feeders compared to dry feeders significantly reduced both the water disappearance at the drinker by up to 34% ($p<0.05$), as seen in Figure 1, and the volume of the slurry by up to 29% ($p<0.05$) for finisher pigs.

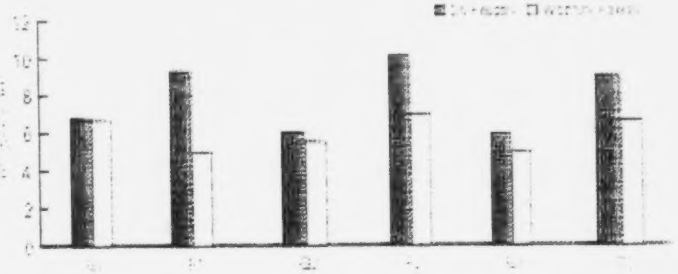

Figure 1: Average water disappearance (WD) for all grower (G1, G2 and G3) and finisher (F1, F2 and F3) trials.

Table 1. Summary of average water balance over three grower-finisher cycles.

Water Usage Components	Parameters	Water (kg/pig-day)			
		Grower		Finisher	
		Dry*	Wet/Dry**	Dry	Wet/Dry
Inputs	Water Disappearance	6.0	5.4	9.3	6.2
	Feed Water	0.3	0.3	0.5	0.5
	Metabolic Water	1.0	1.0	1.6	1.6
Outputs	Manure Water	-5.5	-4.4	-8.9	-5.4
	Pig Water	-0.4	-0.4	-0.7	-0.7
	Ventilated Water	-2.6	-2.7	-4.1	-3.4
Error		1.3	0.8	2.2	1.3

* Dry: dry feeder   ** Wet/Dry: wet/dry feeders

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[2] Dean, College of Engineering, University of Saskatchewan

ENTERPRISE RETURNS MODULE

Project 02-01

Revenues:	Dry Feeder	Wet/Dry Feeder	Difference
Market Hogs	2.063.899	2.063.899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49.575	49.575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10.660	7,722	-$0.21
			$0.00
Total Revenues	**2,124,554**	**2,121,616**	-$0.21
Capital Asset Values:	Dry Feeder	Wet/Dry Feeder	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	Dry Feeder	Wet/Dry Feeder	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	306,776	$0.00
Total Feed	807,465	807,465	$0.00
	57.92		
	Dry Feeder	Wet/Dry Feeder	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	22,936	$0.63
Water Consumption	17,687	13,966	$0.27
Water and Manure Handling:	**49,347**	**36,902**	$0.89
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Dry Feeder	Wet/Dry Feeder
Operating Interest	23,909	23,688
Total Operating	1,371,902	1,359,235
Total Costs	2,092,418	2,079,752
	5 Year Average Feed Cost	
Gross Margin	752,652	762,381
Net Earnings	32,136	41,864
EBITDA	604,335	614,063
ROA	0.64%	0.83%
EBITDA/Sales	28.45%	28.94%
Net Earnings per Hog	$2.30	$3.00

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.70

ENTERPRISE RETURNS MODULE

Project 02-21

Revenues:	Dry Feeder	Wet/Dry Feeder	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	7,722	-$0.21
			$0.00
Total Revenues	2,124,554	2,121,616	-$0.21
Capital Asset Values:	Dry Feeder	Wet/Dry Feeder	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Dry Feeder	Wet/Dry Feeder	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	306,776	$0.00
Total Feed	807,465	807,465	$0.00
	57.92		
	Dry Feeder	Wet/Dry Feeder	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	182,883	182,883	$0.00
Manure Handling	31,660	22,936	$0.63
Water Consumption	17,687	13,966	$0.27
Water and Manure Handling:	49,347	36,902	$0.89
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Dry Feeder	Wet/Dry Feeder
Operating Interest	23,909	23,688
Total Operating	1,371,902	1,359,235
Total Costs	2,092,418	2,079,752
	5 Year Average Feed Cost	
Gross Margin	752,652	762,381
Net Earnings	32,136	41,864
EBITDA	604,335	614,063
ROA	0.64%	0.83%
EBITDA/Sales	28.45%	28.94%
Net Earnings per Hog	$2.20	$3.00

Hog pool price/ckg	$140.00	$140.00

Difference $0.7

Reducing Water Waste From Nipple Drinkers by Growing-Finishing Pigs

Yuzhi Li and Harold Gonyou

Summary

Growing/finishing pigs can maintain adequate water intake from a variety of drinker types and drinker management protocols. However, water waste from drinkers can be very different depending on drinker type and management. Well-managed nipple drinkers can reduce water waste to the same level as bowl drinkers.

Introduction

Our previous study indicated water waste from a nipple drinker could be 40% of water disappearance when the drinker was never raised, rather than being adjusted to a recommended level (2.5 cm above pig shouder). Keeping the drinker height at the recommended level for growing/finishing pigs means the drinker has to be adjusted as the pigs grow. This is rarely done on commercial farms. A new setup of nipple drinkers was used to maintain the drinker at the recommended level for pigs throughout the whole growout period without adjusting its height. Productivity, water use, manure output, and drinking behaviour were compared among pigs from different types and management of drinkers to test the feasibility of the new setup.

Experimental Procedures

Sixteen pens of 18 pigs in a grower/finisher room were used for the 12-wk study. Four types of drinker systems were tested: improved nipple drinkers (new setup), well-managed nipple drinkers, conventional nipple drinkers, and bowl drinkers. The improved nipple drinker was set at 73 cm of height, which is the recommended nipple height for pigs at the body weight of 100 kg. In order to allow the young pigs to reach the nipple drinker, a step was placed beneath the drinker. The height of the step was 25 cm, so the distance between the nipple and the top of the step was 48 cm; that is the recommended nipple height for pigs of 25 kg. The well-managed nipple drinker was adjusted to the recommended height every two weeks according to body weight of the pigs. The conventional nipple drinkers and bowl drinkers were mounted at the height of 48 cm, and not adjusted throughout the whole growing/finishing period as on many commercial farms. Four pens were randomly assigned to each of the drinker treatments. Growth rate, water disappearance, manure output, and drinking behaviour were determined.

Results and Discussion

Final body weight, variations in final body weight, and growth rate were similar among pigs on different drinkers (Table 1). Water disappearance from pigs on the bowl drinkers was lower than pigs on other drinkers during the growing period (Table 1). However, during finishing period, water disappearance for pigs on the bowl drinkers was as high as conventional nipple drinker. The overall water disappearance from pigs on the improved nipple drinkers was similar as those on the well-managed nipple drinkers and bowl drinkers. In comparison with pigs on the conventional nipple drinkers, water disappearance from pigs on the improved nipple drinkers was reduced by 13%. Daily manure output from pigs at different drinkers was similar during the first 4 weeks (Figure 1). Pigs on the conventional nipple drinkers and bowl drinkers produced more manure from wk 4 and wk 8, respectively. The overall average daily manure output from pigs on the improved nipple drinkers was 10% lower than that on conventional nipple drinkers, but similar to those on the well-managed nipples and bowl drinkers. Pigs spent more time drinking from bowl drinkers. Pigs on the improved nipple drinkers spent similar time drinking as those on the well-managed nipple drinkers.

Table 1. Initial and final body weight, coefficient of variation, and water disappearance of growing/finishing pigs at different drinkers.

Item	Bowl	Conventional nipple	Well-managed nipple	Improved nipple	SEM	P <
Initial						
BW, kg	31.5	31.8	31.7	32.1	0.67	NS*
CV, %	13.3	16.3	14.5	12.8	1.21	NS
Final						
BW, kg	104.2	106.0	102.9	104.0	1.98	NS
CV, %	10.8	10.6	10.5	10.8	1.18	NS
Water disappearance, L/pig/d						
Wk 0-4	4.36^{a}	5.41^{b}	5.46^{b}	4.79^{ac}	0.241	0.01
Wk 4-8	6.51^{a}	7.56^{b}	6.89^{bc}	6.61^{ac}	0.293	0.06
Wk 8-12	7.88^{b}	7.84^{b}	6.87^{a}	6.68^{a}	0.345	0.05
Wk0-12	6.25^{a}	6.94^{b}	6.40^{ab}	6.03^{a}	0.247	0.08

BW = average body weight of pigs, CV = coefficient of variation.

*NS = no significant difference (P > 0.10)

a,b,c Within a row, means without a common superscript letter differ (P < 0.05).

Implications

The new setup of nipple drinkers could reduce water wastage without impairing pig performance and drinking behaviour.

Acknowledgements

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council and Saskatchewan Agriculture and Food Development Fund. Additional funding for this project was provided by NSERC.

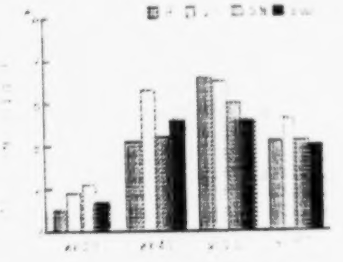

Figure 1: Manure output from growing/finishing pigs at different drinkers. B = bowl drinker, L-N = conventional nipple drinker (nipple height set up at 48cm), S-N = well-managed nipple drinker (height of nipple drinker adjusted according to pig weight), Steps = improved nipple drinker (nipple drinker with step underneath).

ENTERPRISE RETURNS MODULE

Project 02-02

Revenues:	Conventional Nipple Drinker	Well-Managed Nipple Drinker	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,089	-$0.03
			$0.00
Total Revenues	2,087,552	2,087,128	-$0.03

Capital Asset Values:	Conventional Nipple Drinker	Well-Managed Nipple Drinker	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00

Size of Operations (Sows)	Conventional Nipple Drinker	Well-Managed Nipple Drinker	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	167,506	167,506	$0.00
Grower Diets	167,838	167,838	$0.00
Finisher Diets	318,001	318,001	$0.00
Total Feed	784,283	784,283	$0.00

	Conventional Nipple Drinker	Well-Managed Nipple Drinker	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	29,966	$0.09
Water Consumption	17,445	16,811	$0.05
Water and Manure Handling:	48,671	46,277	$0.14

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,579	53,579	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	721,583	721,583	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Conventional Nipple Drinker	Well-Managed Nipple Drinker
Operating Interest	23,420	23,386
Total Operating	1,343,832	1,341,904
Total Costs	2,065,415	2,063,487
	5 Year Average Feed Cost	
Gross Margin	743,721	745,224
Net Earnings	22,137	23,640
EBITDA	595,418	596,922
ROA	0.44%	0.47%
EBITDA/Sales	28.52%	28.60%
Net Earnings per Hog	$1.62	$1.73

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.11

ENTERPRISE RETURNS MODULE

Project 02-01

Revenues:	Conventional Nipple Drinker	Well-Managed Nipple Drinker	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,089	-$0.03
			$0.00
Total Revenues	2,087,552	2,087,128	-$0.03

Capital Asset Values:	Conventional Nipple Drinker	Well-Managed Nipple Drinker	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00

Size of Operations (Sows)	Conventional Nipple Drinker	Well-Managed Nipple Drinker	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	167,506	167,506	$0.00
Grower Diets	167,838	167,838	$0.00
Finisher Diets	318,001	318,001	$0.00
Total Feed	784,283	784,283	$0.00

	Conventional Nipple Drinker	Well-Managed Nipple Drinker	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	29,966	$0.09
Water Consumption	17,445	16,811	$0.05
Water and Manure Handling:	48,671	46,777	$0.14
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,579	53,579	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	721,583	721,583	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Conventional Nipple Drinker	Well-Managed Nipple Drinker
Operating Interest	23,420	23,386
Total Operating	1,343,832	1,341,904
Total Costs	2,065,415	2,063,487
	5 Year Average Feed Cost	
Gross Margin	743,721	745,224
Net Earnings	22,137	23,640
EBITDA	595,410	596,922
ROA	0.44%	0.47%
EBITDA/Sales	28.52%	28.60%
Net Earnings per Hog	$1.62	$1.73

Hog pool price/ckg	$140.00	$140.00

Difference $0.11

ENTERPRISE RETURNS MODULE

Project 02-02

Revenues:	Conventional Nipple Drinker	Improved Nipple Drinker	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,089	-$0.03
			$0.00
Total Revenues	2,087,552	2,087,128	-$0.03

Capital Asset Values:	Conventional Nipple Drinker	Improved Nipple Drinker	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00

Size of Operations (Sows)	Conventional Nipple Drinker	Improved Nipple Drinker	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	167,506	167,506	$0.00
Grower Diets	167,838	167,838	$0.00
Finisher Diets	318,001	318,001	$0.00
Total Feed	784,283	784,283	$0.00

	Conventional Nipple Drinker	Improved Nipple Drinker	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	29,966	$0.09
Water Consumption	17,445	16,047	$0.10
Water and Manure Handling:	48,671	46,012	$0.19
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,579	53,579	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	721,583	721,583	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows	Conventional Nipple Drinker	Improved Nipple Drinker
Operating Interes	23,420	23,373
Total Operatin	1,343,832	1,341,126
Total Costs	2,065,415	2,062,709
	5 Year Average Feed Cost	
Gross Margin	743,721	746,002
Net Earnings	22,137	24,419
EBITDA	595,418	597,700
ROA	0.44%	0.49%
EBITDA/Sales	28.52%	28.64%
Net Earnings per Hog	$1.62	$1.78

Hog pool price/ckg	$140.00	$140.00
Difference		$0.17

ENTERPRISE RETURNS MODULE

Project 02-0

Revenues:	Conventional Nipple Drinker	Water Bowls	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,089	-$0.03
			$0.00
Total Revenues	**2,087,552**	**2,087,128**	-$0.03

Capital Asset Values:	Conventional Nipple Drinker	Water Bowls	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,030,069**	**5,030,069**	$0.00

Size of Operations (Sows)	Conventional Nipple Drinker	Water Bowls	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	167,506	167,506	$0.00
Grower Diets	167,838	167,838	$0.00
Finisher Diets	318,001	318,001	$0.00
Total Feed	784,283	784,283	$0.00

	Conventional Nipple Drinker	Water Bowls	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	29,966	$0.09
Water Consumption	17,445	16,270	$0.09
Water and Manure Handling:	**48,671**	**46,236**	$0.18
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,579	53,579	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	**721,583**	**721,583**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Conventional Nipple Drinker	Water Bowls
Operating Interest	23,420	23,377
Total Operating	1,343,832	1,341,353
Total Costs	2,065,415	2,062,937
	5 Year Average Feed Cost	
Gross Margin	743,721	745,774
Net Earnings	22,137	24,191
EBITDA	595,418	597,472
ROA	0.44%	0.48%
EBITDA/Sales	28.52%	28.63%
Net Earnings per Hog	$1.62	$1.77

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.15

ENTERPRISE RETURNS MODULE

Revenues	Conventional Nipple Drinker	Improved Nipple Drinker	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,085	-$0.03
			$0.00
Total Revenues	2,087,552	2,087,128	-$0.03

Capital Asset Values	Conventional Nipple Drinker	Improved Nipple Drinker	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00

Size of Operations (Sows)	Conventional Nipple Drinker	Improved Nipple Drinker	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	167,506	167,506	$0.00
Grower Diets	167,838	167,838	$0.00
Finisher Diets	318,001	318,001	$0.00
Total Feed	784,283	784,283	$0.00

	Conventional Nipple Drinker	Improved Nipple Drinker	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	29,966	$0.09
Water Consumption	17,445	16,047	$0.10
Water and Manure Handling:	48,671	46,012	$0.19
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,579	53,579	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	721,583	721,583	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Conventional Nipple Drinker	Improved Nipple Drinker
Operating Interest	23,420	23,373
Total Operating	1,343,831	1,341,126
Total Costs	2,065,413	2,062,709
	5 Year Average Feed Cost	
Gross Margin	743,721	746,002
Net Earnings	22,137	24,419
EBITDA	595,418	597,700
ROA	0.44%	0.49%
EBITDA/Sales	28.52%	28.64%
Net Earnings per Hog	$1.62	$1.79

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.17

ENTERPRISE RETURNS MODULE

Project 02-0

Revenues:	Conventional Nipple Drinker	Water Bowls	Difference
Market Hog	2,027,044	2,027,044	$0.00
Weaners/weanling			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,089	-$0.03
			$0.00
Total Revenues	2,087,552	2,087,128	-$0.03

Capital Asset Values:	Conventional Nipple Drinker	Water Bowls	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00

Size of Operations (Sows)	Conventional Nipple Drinker	Water Bowls	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	167,506	167,506	$0.00
Grower Diets	167,838	167,838	$0.00
Finisher Diets	318,001	318,001	$0.00
Total Feed	784,283	784,283	$0.00

	Conventional Nipple Drinker	Water Bowls	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	29,966	$0.09
Water Consumption	17,445	16,270	$0.09
Water and Manure Handling:	48,671	46,236	$0.18
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,579	53,579	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	721,583	721,583	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Conventional Nipple Drinker	Water Bowls
Operating Interest	23,420	23,377
Total Operating	1,343,832	1,341,353
Total Costs	2,065,415	2,062,937
		5 Year Average Feed Cost
Gross Margin	743,721	745,774
Net Earnings	22,137	24,191
EBITDA	595,418	597,472
ROA	0.44%	0.48%
EBITDA/Sales	28.52%	28.63%
Net Earnings per Hog	$1.6	$1.7

Hog pool price/ckg	$140.00	$140.00

Difference $0.1

Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs

Ruurd Zijlstra, David Overend [1], David Hickling [2], P Howard Simmins [3], and John Patience

Summary

Feed processing and nutritional quality for CPS and durum wheats have traditionally been expected to be lower than for Hard Red Spring (HRS). Performance of weaned pigs was compared among six wheat classes, whilst considering particle size and diet pellet quality. Results indicated that feed processing quality and growth performance did not differ among wheat classes. Weaned pigs fed various classes of wheat including CPS and durum may grow similarly.

Introduction

The processing and nutritional quality of wheat is expected to vary among classes; CPS and durum wheat are currently segregated. A range in wheat protein and fibre or non-starch polysaccharide (NSP) content may partly cause quality variation. The present study was designed to test whether wheat class by itself impacts feed processing or nutritional quality.

Experimental Procedures

Two cultivars from each of six classes (CPS White and Red, HRS, durum, Hard Red Winter (HRW) and Hard White (HW)) were collected (Table 1). Protein ranged from 12.2 to 17.4% and total NSP from 9.0 to 11.5% (Table 2). A 3-week growth and digestibility study was conducted with 12-kg weaned pigs (PIC, 39-day-old; 4 pigs/pen, 12 pens per cultivar), which were fed pelleted 65%-wheat diets (3.5 Mcal DE/kg, 3.4 g dig. lysine/Mcal).

Results and Discussion

Wheat particle size ranged from 536 to 734 mm (10/64"-screen) (Table 2). Pellet Durability index was 96 for all diets. Feed processing quality was thus excellent for all wheat classes. In the growth study, average daily gain (ADG), average daily feed intake (ADFI), and feed efficiency did not differ among wheat classes for day 0 to 21 (Figure 1). However, some minor differences were observed in the first week. For example, ADG for durum was 9% lower than for HRW, and similar among other classes; ADFI for HW was 7% lower than for HRW, and similar among other classes. Finally, diet energy digestibility (and thus DE content) was lowest for CPS Red (86.5%), medium for CPS White, HRS and HW (87.2 to 87.5%) and highest for HRW and Durum (88.6 & 88.9%) (Figure 2).

Implications

Protein but not NSP content varied among 12 wheat cultivars harvested in western Canada in 2001. Wheat protein content was "corrected for" during diet formulation and did not affect pig performance. Wheat NSP content was low overall, indicating that all 12 wheat samples were of excellent nutritional quality. Still, DE content ranged 7% and was highest for durum. Reductions in ADG and ADFI for CPS and durum wheat were limited to the first two weeks, and did not exist after three weeks.

In conclusion, despite variations in wheat DE content, weaned pigs fed various classes of wheat including CPS and durum performed equally. Wheat class by itself was not a cause for a range in feed processing or nutritional quality.

Acknowledgements

Strategic program funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council, and Saskatchewan Agriculture and Food Development Fund. Project funding was provided by the Canadian Wheat Board, Canadian International Grains Institute, Feed-Rite (Ridley Inc.), Danisco Animal Nutrition, Degussa, and Quality Assured Seeds.

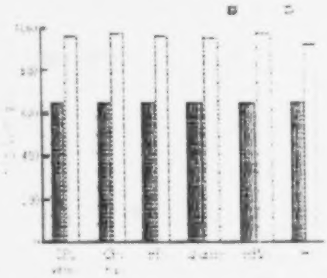

Figure 1: Effects of wheat class on average daily gain (ADG) and feed intake (ADFI) of weaned pigs in the 3-week growth study.

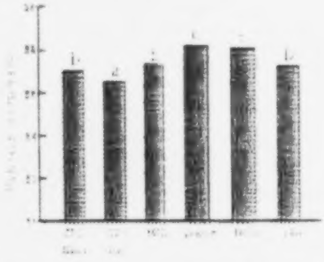

Figure 2: Effect of wheat class on diet energy digestibility measured in weaned pigs.

Table 1. The Canadian Wheat Board classes and popular names for the used wheats.

Canadian Wheat Board Class	Popular Name
Canadian Prairie Spring White	CPS White
Canadian Prairie Spring Red	CPS Red
Canadian Western Red Spring	Hard Red Spring (HRS)
Canadian Western Amber Durum	Durum
Canadian Western Red Winter	Hard Red Winter (HRW)
Canadian Western Hard White	Hard White (HW)

Table 2. Protein and NSP content and particle size of the ground wheat. Each value represents one of two cultivars per class.

Wheat class	Protein (% as is)	Total NSP (% as is)	Particle size (% as is)
CPS White	15.1,16.1	11.3,11.4	591,700
CPS Red	12.4,15.8	11.0,11.3	556,631
HRS	15.4,17.1	10.8,15.5	640,708
Durum	16.3,16.8	9.0,10.1	624,734
HRW	12.2,13.7	9.7,10.9	536,636
HW	16.5,17.4	10.9,11.3	629,724

[1] Ridley Inc., Mankato, MN

[2] Canadian International Grains Institute, Winnipeg, MB; presently Canola Council of Canada, Winnipeg, MB

[3] Danisco Animal Nutrition, Marlborough, UK

ENTERPRISE RETURNS MODULE

Project 02-03

Revenues:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,014	$0.07
Nursery Diets	198,861	197,247	$0.12
Grower Diets	170,889	167,813	$0.22
Finisher Diets	306,776	302,555	$0.30
Total Feed	807,465	797,629	$0.71
	57.92		

Misc. Costs:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40	
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40
Operating Interest	23,909	23,735
Total Operating	1,371,902	1,361,891
Total Costs	2,092,418	2,082,407
	5 Year Average Feed Cost	
Gross Margin	752,652	762,563
Net Earnings	32,136	42,146
EBITDA	604,335	614,345
ROA	0.64%	0.84%
EBITDA/Sales	28.45%	28.92%
Net Earnings per Hog	$2.30	$3.02

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.72

ENTERPRISE RETURNS MODULE

Project 02-03

Revenues:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,014	$0.07
Nursery Diets	198,861	197,247	$0.12
Grower Diets	170,889	167,813	$0.22
Finisher Diets	306,776	302,555	$0.30
Total Feed	807,465	797,629	$0.71
	57.92		

	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$135.40
Operating Interest	23,909	23,735
Total Operating	1,371,902	1,361,891
Total Costs	2,092,418	2,082,407
	5 Year Average Feed Cost	
Gross Margin	752,652	762,663
Net Earnings	32,136	42,146
EBITDA	604,335	614,345
ROA	0.64%	0.84%
EBITDA/Sales	28.45%	28.92%
Net Earnings per Hog	$2.30	$3.0[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference $0.7[illegible]

ENTERPRISE RETURNS MODULE

Project 02-03

Revenues:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,551	$0.10
Nursery Diets	198,861	196,440	$0.17
Grower Diets	170,889	166,275	$0.33
Finisher Diets	306,776	300,444	$0.45
Total Feed	807,465	792,711	$1.06
	57.92		

	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90
Operating Interest	23,909	23,648
Total Operating	1,371,902	1,356,886
Total Costs	2,092,418	2,077,402
	5 Year Average Feed Cost	
Gross Margin	752,652	767,668
Net Earnings	32,136	47,151
EBITDA	604,335	619,351
ROA	0.64%	0.94%
EBITDA/Sales	28.45%	29.15%
Net Earnings per Hog	$2.30	$3.38

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.06

ENTERPRISE RETURNS MODULE

Project 02-03

Revenues:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,088	$0.13
Nursery Diets	198,861	195,633	$0.23
Grower Diets	170,889	164,738	$0.44
Finisher Diets	306,776	298,333	$0.61
Total Feed	807,465	787,793	$1.41
	57.92		

	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
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Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
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Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40
Operating Interest	23,909	23,560
Total Operating	1,371,902	1,351,880
Total Costs	2,092,418	2,072,397
	5 Year Average Feed Cost	
Gross Margin	752,652	772,673
Net Earnings	32,136	52,157
EBITDA	604,335	624,356
ROA	0.64%	1.04%
EBITDA/Sales	28.45%	29.39%
Net Earnings per Hog	$2.30	$3.74

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.44

ENTERPRISE RETURNS MODULE

Project 02-0

Revenues	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,551	$0.10
Nursery Diets	198,861	196,440	$0.17
Grower Diets	170,889	166,275	$0.33
Finisher Diets	306,776	300,444	$0.45
Total Feed	807,465	792,711	$1.06
	57.92		

	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90
Operating Interest	23,909	23,648
Total Operating	1,371,902	1,356,886
Total Costs	2,092,418	2,077,402
	5 Year Average Feed Cost	
Gross Margin	752,652	767,668
Net Earnings	32,136	47,151
EBITDA	604,335	619,351
ROA	0.64%	0.94%
EBITDA/Sales	28.45%	29.15%
Net Earnings per Hog	$2.30	$3.35

Hog pool price/ckg	$140.00	$140.00

Difference $1.06

ENTERPRISE RETURNS MODULE

Project 02-01

Revenues:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,088	$0.13
Nursery Diets	198,861	195,633	$0.23
Grower Diets	170,889	164,738	$0.44
Finisher Diets	306,776	298,333	$0.61
Total Feed	807,465	787,793	$1.41
	57.92		

	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handing:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec Farrowing	210,955	210,955	$0.00
Interest and Deprec Nursery	93,785	93,785	$0.00
Interest and Deprec Grower	106,877	106,877	$0.00
Interest and Deprec Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$130.40
Operating Interest	23,909	22,560
Total Operating	1,371,902	1,351,880
Total Costs	2,092,418	2,072,397
		5 Year Average Feed Cost
Gross Margin	752,652	772,673
Net Earnings	32,136	52,157
EBITDA	604,335	624,356
ROA	0.64%	1.04%
EBITDA/Sales	28.45%	29.39%
Net Earnings per Hog	$2.30	$3.74

Hog pool price/ckg	$140.00	$140.00
Difference		$1.41

Effects of Large Group Size on Productivity of Grower-Finisher Pigs

Thusith Samarakone and Harold Gonyou

Introduction

Traditionally, pigs in North America are penned in groups of 10-40 animals. Over the past few years the concept of "large groups" has become more common with group sizes of 50-100 pigs/pen or even more, as a management strategy to reduce housing cost, improve space use and increase overall profitability. However, there are concerns that social instability in large groups may result in poor growth, higher mortality and morbidity and higher variation in body weights at the end of production.

Large group size has little effect on pig performance

The present study was aimed at comparing the production performance of grower-finisher pigs formed into a larger group (108 pigs/pen) to a conventional small group size (18 pigs/pen) and to see if this trend in the pig industry is beneficial to producers.

Experimental Procedures

Eight 11-week trials of four groups of 18 (small group) and two groups of 108 grower-finisher pigs (large group) per pen were evaluated. Equal numbers of barrows and gilts (1:1) were used in each group. Initial body weight and body weight variation (CV) were 31.9 kg and 14.8% and 31.6 kg and 15.7% for small and large groups respectively. One wet/dry ad-libitum feeder space was provided for every nine pigs. Floor space per pig in the fully slatted rooms was identical between the two group sizes.

Average daily feed intakes (ADFI) were recorded for four trials during two experimental periods (week 2 to 5 and week 7 to 11). Body weight variation within the group (CV) at the end of each trial, average daily gain (ADG) and pig mortality and morbidity were determined for all eight trials.

Results

Pigs in smaller groups had a higher growth rate (10%, $P< 0.05$) during first 2-week period. ADG for the entire grower-finisher period was slightly higher (2%, $P< 0.05$) for the pigs in the smaller groups compared to larger groups (Figure1).

ADFI during week 2-5 and week 7-11 was similar between the two group sizes (Figure 2) and no difference was observed on feed efficiency for the above two periods.

At the end of the experimental period, variation in pig body weight within a group (CV) was similar between the two groups (9.6% vs. 10.3% for small and large groups respectively).

No significant differences were observed between the two group sizes on percentage pigs removed (Figure 3).

Implications

Although pigs in larger group size tend to have a slight reduction in overall ADG, in general, the performance of the pigs in larger group size was not inferior to the smaller group size evaluated in this study during the grower-finisher period.

Acknowledgements

Strategic program funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council and Saskatchewan Agriculture and Food Development Fund. Additional funding for this project was provided by NSERC.

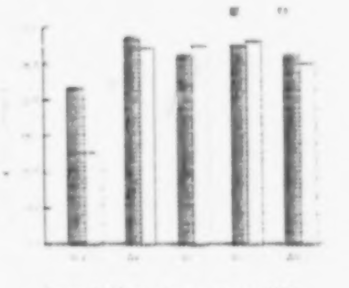

Figure 1: Effect of group size on ADG

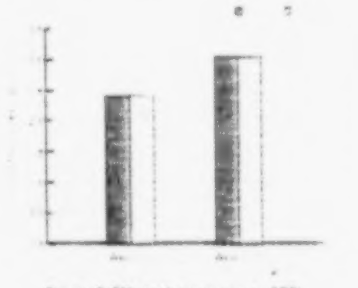

Figure 2: Effect of group size on ADFI

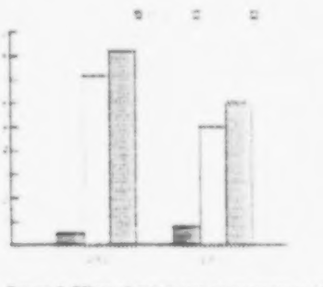

Figure 3: Effect of group size on percentage of pigs removed

ENTERPRISE RETURNS MODULE

Project 02-04

Revenues:	Small Groups	Large Groups - New Construction	Difference
Market Hogs	2,027,044	2,013,185	-$1.01
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,073,693	-$1.01

Capital Asset Values:	Small Groups	Large Groups - New Construction	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	918,131	$0.31
Finisher Facilities	1,265,993	1,266,196	-$0.01
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,023,355	$0.49

Size of Operations (Sows)	Small Groups	Large Groups - New Construction	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	167,506	167,506	$0.00
Grower Diets	167,838	160,107	$0.56
Finisher Diets	318,001	312,767	$0.38
Total Feed	784,283	771,319	$0.95

	Small Groups	Large Groups - New Construction	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	80,515	$0.17
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	104,787	$0.15
Interest and Deprec: Finisher	145,917	144,583	$0.10
Management Salaries	94,723	94,723	$0.00
Insurance	53,579	53,518	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	721,583	718,098	$0.25

5 Year Average Feed Cost

Size of Operations (Sows)	Small Groups	Large Groups - New Construction
Operating Interest	23,420	23,148
Total Operating	1,343,832	1,328,227
Total Costs	2,065,415	2,046,326
	5 Year Average Feed Cost	
Gross Margin	743,721	745,466
Net Earnings	22,137	27,368
EBITDA	595,418	597,225
ROA	0.44%	0.54%
EBITDA/Sales	28.52%	28.80%
Net Earnings per Hog	$1.62	$2.00

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.38

ENTERPRISE RETURNS MODULE

Project 23-04

Revenues	Small Groups	Large Groups - New Construction	Difference
Market Hogs	2,027,044	2,012,185	-$1.01
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,073,693	-$1.01

Capital Asset Values	Small Groups	Large Groups - New Construction	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	918,131	$0.51
Finisher Facilities	1,265,993	1,266,196	-$0.01
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,023,355	$0.45

Size of Operations (Sows)	Small Groups	Large Groups - New Construction	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	167,506	167,506	$0.00
Grower Diets	167,838	160,107	$0.56
Finisher Diets	318,001	312,767	$0.38
Total Feed	784,283	771,319	$0.95

	Small Groups	Large Groups - New Construction	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	80,515	$0.17
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	104,787	$0.15
Interest and Deprec: Finisher	145,917	144,583	$0.11
Management Salaries	94,723	94,723	$0.00
Insurance	53,579	53,518	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	721,583	718,098	$0.27

5 Year Average Feed Cost		
Size of Operations (Sows)	Small Groups	Large Groups - New Construction
Operating Interest	23,420	23,148
Total Operating	1,343,831	1,328,227
Total Costs	2,065,415	2,046,326
	5 Year Average Feed Cost	
Gross Margin	743,721	745,461
Net Earnings	22,137	27,368
EBITDA	595,418	597,221
ROA	0.44%	0.54%
EBITDA/Sales	28.52%	28.80%
Net Earnings per Hog	$1.62	$2.00

Hog pool price/ckg	$140.00	$140.00

Difference $0.31

Effect of Dietary Crude Protein Cotent and Phase Feeding on Performance and Urinary Nitrogen Excretion of Grower Pigs

Nicole Rodgers[1] and Ruurd Zijlstra

Summary

Nitrogen excretion is of concern because of its potential impact on the environment inside and outside the barn. Urinary nitrogen excretion can be reduced using dietary manipulations. Results indicate that a 2% reduction of dietary protein content throughout the grower phase reduced urinary nitrogen excretion by 22% without affecting performance. Phase feeding did not affect urinary nitrogen excretion or performance.

> *Urinary nitrogen excretion can be reduced more effectively by reducing dietary protein content than by using phase feeding*

Introduction

Urinary nitrogen is emitted easily as ammonia while faecal nitrogen is less volatile because it is bound within proteins. Reduction of dietary protein while balancing for amino acids is a direct way to reduce urinary nitrogen excretion and ammonia emission. Phase feeding might allow a better dietary matching of the rapidly changing amino acid requirements of grower pigs and thereby further reduce the urinary excretion of excess dietary nitrogen.

Experimental Procedures

Two levels of dietary crude protein (high, avg 19%; low, avg. 17%; ideal amino acid profile 3,400 kcal DE/kg) and three different phase feeding programs (2 diets for 3 week each, 3 diets for 2 week each, and 6 diets for 1 week each; Figure 1) were used as six treatments in a 2 x 3 factorial arrangement with 27.5-kg barrows. In a performance study, pigs were housed five pigs/pen with free access to feed. In a metabolism study, pigs were housed in individual pens; faeces and urine were collected.

Results and Discussion

In the 6-week performance study, average daily gain (ADG; Figure 2) and average daily feed intake did not differ between the high and low crude protein level or among the three phase feeding programs. For successful implementation of dietary strategies to reduce nitrogen excretion, growth performance should not be reduced. For the entire six-week metabolism study, urinary nitrogen excretion was reduced 22% by feeding low instead of high protein diets (Figure 3) but did not differ among the three phase feeding programs. Faecal nitrogen excretion did not differ among the dietary treatments.

Implications

Lower total nitrogen excretion may reduce land base needed to apply manure in a sustainable manner. Lower urinary nitrogen excretion will reduce ammonia emission inside and outside the barn. The cost for implementing low protein diets will greatly depend on fluctuating ingredient prices. For example at the present time for diets with an optimized digestible nutrient content, a 2% reduction in dietary crude protein increases the cost by $ 5 to 10 per tonne.

Acknowledgements

Strategic program funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council, and Saskatchewan Agriculture and Food Development Fund. Project funding was provided by NSERC and AAFC.

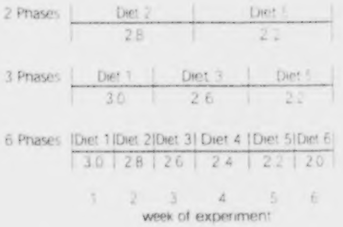

***Figure 1**: The three phase feeding programs with lysine values in g dig. lysine per Mcal DE. Diet 1 contained 21.5 (high) or 19.5% (low) crude protein in 1% increments down to 16.5 (high) or 14.5% (low) crude protein for Diet 6.*

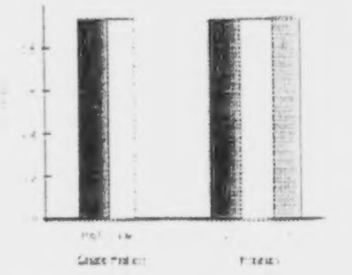

***Figure 2**: Effects of dietary crude protein and phase feeding on average daily gain of grower pigs in the 6-week performance study.*

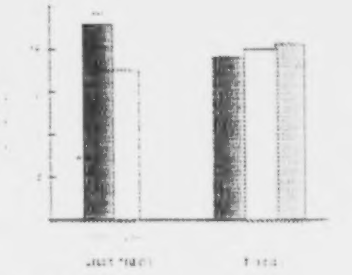

***Figure 3**: Effects of dietary crude protein and phase feeding on urinary nitrogen excretion of grower pigs in the 6-week metabolism study.*

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[1] PSC and Department of Animal and Poultry Science, University of Saskatchewan

75

ENTERPRISE RETURNS MODULE

Project 02-05

Revenues	Standard G-F Diet	Low CP Diet @ $5.00/mt	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	9,377	-$0.09
			$0.00
Total Revenues	**2,124,554**	**2,123,271**	-$0.09

Capital Asset Values	Standard G-F Diet	Low CP Diet @ $5.00/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $5.00/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	175,635	-$0.34
Finisher Diets	306,776	317,457	-$0.77
Total Feed	807,465	822,892	-$1.11
	57.92		

	Standard G-F Diet	Low CP Diet @ $5.00/mt	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
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Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	27,850	$0.27
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**45,537**	$0.27
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $5.00/mt
Operating Interest	23,909	24,115
Total Operating	1,371,902	1,383,724
Total Costs	2,092,418	2,104,241
	5 Year Average Feed Cost	
Gross Margin	752,652	739,546
Net Earnings	32,136	19,030
EBITDA	604,335	591,229
ROA	0.64%	0.38%
EBITDA/Sales	28.45%	27.85%
Net Earnings per Hog	$2.30	$1.36

Hog pool price/ckg	$140.00	$140.00
Difference		($0.94)

ENTERPRISE RETURNS MODULE

Revenues	Standard G-F Diet	Low CP Diet @ $5.00/mt	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	9,377	-$0.09
			$0.00
Total Revenues	**2,124,554**	**2,123,271**	-$0.09

Capital Asset Values	Standard G-F Diet	Low CP Diet @ $5.00/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $5.00/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	175,635	-$0.34
Finisher Diets	306,776	317,457	-$0.77
Total Feed	807,465	822,892	-$1.11
	57.92		

	Standard G-F Diet	Low CP Diet @ $5.00/mt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	27,850	$0.27
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**45,537**	$0.27

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $5.00/mt
Operating Interest	23,909	24,115
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	5 Year Average Feed Cost	
Gross Margin	752,652	739,546
Net Earnings	32,136	19,030
EBITDA	604,335	591,229
ROA	0.64%	0.38%
EBITDA/Sales	28.45%	27.85%
Net Earnings per Hog	$2.30	$1.36

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.94)

ENTERPRISE RETURNS MODULE

Project 02-05

Revenues:	Standard G-F Diet	Low CP Diet @ $7.50/mt	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	9,377	-$0.09
			$0.00
Total Revenues	2,124,554	2,123,271	-$0.09

Capital Asset Values:	Standard G-F Diet	Low CP Diet @ $7.50/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $7.50/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	178,008	-$0.51
Finisher Diets	306,776	322,797	-$1.15
Total Feed	807,465	830,605	-$1.66
	57.92		

	Standard G-F Diet	Low CP Diet @ $7.50/mt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
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Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
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Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	45,537	$0.27
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
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Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $7.50/mt
Operating Interest	23,909	24,252
Total Operating	1,371,902	1,391,574
Total Costs	2,092,418	2,112,091
	5 Year Average Feed Cost	
Gross Margin	752,652	731,696
Net Earnings	32,136	11,180
EBITDA	604,335	583,379
ROA	0.64%	0.22%
EBITDA/Sales	28.45%	27.48%
Net Earnings per Hog	$2.30	$0.80

Hog pool price/ckg	$140.00	$140.00
Difference		($1.50)

ENTERPRISE RETURNS MODULE

Project 02-05

Revenues:	Standard G-F Diet	Low CP Diet @ $10.00/mt	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	9,377	-$0.09
			$0.00
Total Revenues	**2,124,554**	**2,123,271**	-$0.09

Capital Asset Values:	Standard G-F Diet	Low CP Diet @ $10.00/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $10.00/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	180,381	-$0.68
Finisher Diets	306,776	328,138	-$1.53
Total Feed	807,465	838,319	-$2.21
	57.92		

	Standard G-F Diet	Low CP Diet @ $10.00/mt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
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Marketing & Transportation	69,709	69,709	$0.00
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Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	27,850	$0.27
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**45,537**	$0.27
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
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Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $10.00/mt
Operating Interest	23,909	24,389
Total Operating	1,371,902	1,399,425
Total Costs	2,092,418	2,119,941
	5 Year Average Feed Cost	
Gross Margin	752,652	723,846
Net Earnings	32,136	3,330
EBITDA	604,335	575,529
ROA	0.64%	0.07%
EBITDA/Sales	28.45%	27.11%
Net Earnings per Hog	$2.30	$0.24

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.07)

ENTERPRISE RETURNS MODULE

Project 02-05

Revenues	Standard G-F Diet	Low CP Diet @ $7.50/mt	Difference
Market Hog	2,063,899	2,063,899	$0.00
Weaners/weaning			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	9,377	-$0.09
			$0.00
Total Revenues	2,124,554	2,123,271	-$0.09

Capital Asset Values	Standard G-F Diet	Low CP Diet @ $7.50/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $7.50/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	178,008	-$0.51
Finisher Diets	306,776	322,797	-$1.15
Total Feed	807,465	830,605	-$1.66
	57.92		

	Standard G-F Diet	Low CP Diet @ $7.50/mt	
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Veterinary, Medicine & Supplies	34,855	34,855	$0.00
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5 Year Average Feed Cost		
Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $7.50/mt
Operating Interest	23,909	24,252
Total Operating	1,371,902	1,391,574
Total Costs	2,092,418	2,112,091
	5 Year Average Feed Cost	
Gross Margin	752,652	731,696
Net Earnings	32,136	11,180
EBITDA	604,335	583,379
ROA	0.64%	0.22%
EBITDA/Sales	28.45%	27.48%
Net Earnings per Hog	$2.30	$0.80

Hog pool price/ckg	$140.00	$140.00
		Difference ($1.50)

ENTERPRISE RETURNS MODULE

Project 02-05

Revenues:	Standard G-F Diet	Low CP Diet @ $10.00/mt	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	9,377	-$0.09
			$0.00
Total Revenues	**2,124,554**	**2,123,271**	-$0.09

Capital Asset Values:	Standard G-F Diet	Low CP Diet @ $10.00/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $10.00/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	180,381	-$0.68
Finisher Diets	306,776	328,138	-$1.53
Total Feed	807,465	838,319	-$2.21
	57.92		

	Standard G-F Diet	Low CP Diet @ $10.00/mt	
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Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	27,850	$0.27
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**45,537**	$0.27
Fixed Costs:			
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Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Standard G-F Diet	Low CP Diet @ $10.00/mt
Operating Interest	23,909	24,389
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	5 Year Average Feed Cost	
Gross Margin	752,652	723,846
Net Earnings	32,136	3,330
EBITDA	604,335	575,529
ROA	0.64%	0.07%
EBITDA/Sales	28.45%	27.11%
Net Earnings per Hog	$2.30	$0.24

Hog pool price/ckg	$140.00	$140.00

Difference: ($2.07)

The Impact of Feeder Adjustment and Group Size / Density on Weanling Pig Performance

Laura Smith, A. Denise Beaulieu *Ph.D.*, John, F. Patience *Ph.D.*, Harold W. Gonyou *Ph.D.*, and R. Dean Boyd[1] *Ph.D.*

Summary

An experiment was conducted to examine the impact of group size / density and feeder adjustment on the performance of weanling pigs. Providing more floor space resulted in increased body weight at 10 weeks of age. Performance was maximized when the feeder gap allowed for 40% of the trough to be covered with feed. Moreover, proper adjustment of the feeder reduced the time spent eating and thus increased feeder capacity.

Introduction

Crowding and /or reduced floor space allowance negatively affects nursery performance and exacerbates social vices such as tail-biting, side-nudging and ear chewing. Feeder adjustment impacts feed intake and can alter feeder capacity. Since some of the detrimental effects of crowding are due to decreased feed intake, adequate floor space and proper feeder adjustment may act in a synergistic fashion to improve pig performance.

Experimental Procedures

Seven hundred and sixteen pigs weaned at an average of 18.2 days of age were assigned to: 1) 24 pigs per pen, 2.5 ft^2 per pig, 2) 20 pigs per pen, 3.0 ft^2 per pig (approximates commercial conditions); and 3) 16 pigs per pen, 3.75 ft^2 per pig (approximates the Canadian Code of Practice) for a 42 day trial. A commercial, 6 space feeder with an overall width of __. Eight days later (d0 of exp.) feeders were adjusted to provide gap openings of 9.2, 11.8, 17.9, 24.8 and 31.5 mm (see Figures 1 to 3). Only a small bead of feed was available with an opening of 9.2 mm while the entire trough was covered with an opening of 31.5 mm. Feeding behaviour was videotaped on days 3 to 6

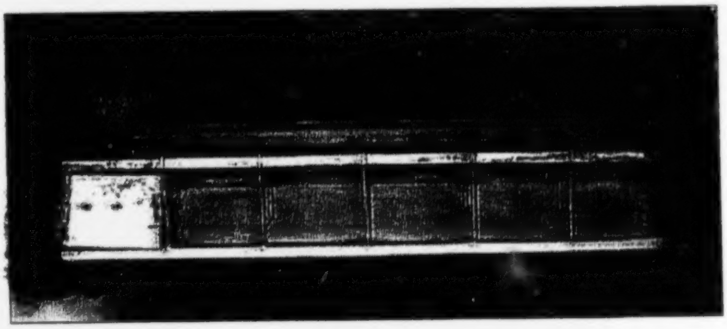

Figure 1 **Feeder trough coverage with a gap adjustment providing a gap opening of 9.2 mm.**

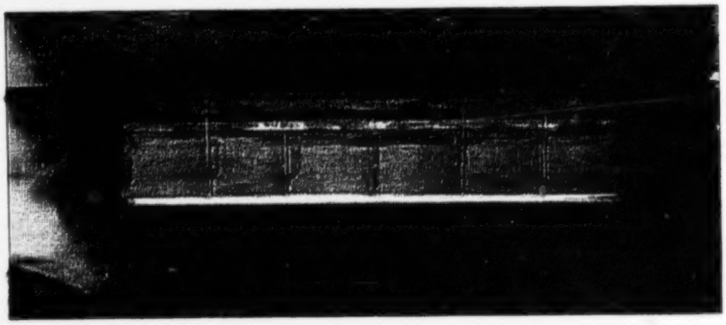

Figure 2 **Feeder trough coverage with a gap adjustment providing a gap opening of 17.9 mm.**

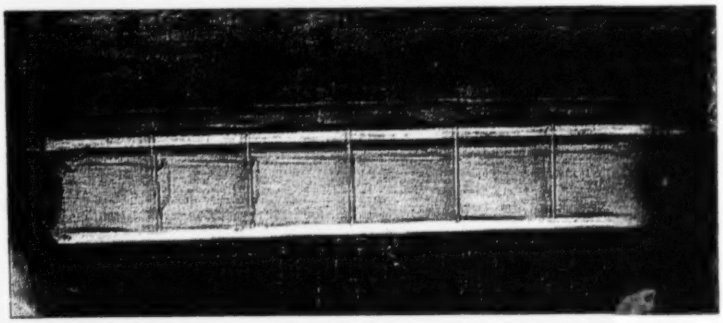

Figure 3 **Feeder trough coverage with a gap adjustment providing a gap opening of 31.5 mm.**

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[1] Pig Improvement Company Franklin, KY

and on days 39 to 42. On day 42, each pig was scored for incidence and severity of tail biting, side nudging and ear chewing.

Results and Discussion

The effect of treatment on body weight and feed intake were not apparent until the second half of the experiment. Body weight, daily gain and feed intake were maximized with a minimum feeder gap size of 18 mm ($P < 0.05$) or when at least 40% of the feeder trough was covered with feed ($P < 0.05$; Table 1). Younger pigs spent more time eating with a reduced feeder gap; however feed intake and daily gain were lower ($P < 0.05$; Table 1). Assuming feeder capacity is achieved when it is being used 90% of the time, the maximum capacity of a nursery feeder space would be nine pigs when adjusted to a 9 mm gap, but 11 pigs when adjusted to a 25 mm gap. The optimal feeder gap would change with different feed particle size and form; however it is achieved when at least 40% of the trough is covered with feed. Feeders with smaller gaps also required frequent unclogging (data not shown).

Less crowding and 40% coverage in the feeder tray offers the best economic return.

Decreasing group size and providing more floor space per pig resulted in increased final weight, daily gain, and feed intake (Table 1). When expressed on pork produced per square foot of floor space, the results favour crowding. However, previous research at PSC Elstow revealed that for every kilogram increase in body weight at 11 weeks of age, body weight at 17 weeks of age increased by 1.5 to 1.8 kg. The economics favour reduced crowding when considering the increased growth rate.

The effects of density/group size on final weight was more dramatic with a reduced feeder gap opening (feeder adjustment and group size/density interaction, $P < 0.05$; Figure 4). Neither floor space allowance or feeder adjustment affected the incidents of aggression, measured by skin lesion scores.

Implications

Body weight at 10 weeks of age was greater with increased floor space allowance, however, the kg of pork produced per square foot of floor space was increased with crowding. Nonetheless, when considering the increased net income due to the increase in nursery exit weight, the present results favour reduced crowding.

Optimal feeder gap is obtained when at least 40% of the feeder is covered with feed. Proper feeder gap adjustment reduced the time spent eating and thus increased feeder capacity. Assuming that feeder capacity is achieved when it is being used 90% of the time, the maximum capacity of a nursery feeder space would be nine pigs when adjusted to a 9 mm gap, but 11 pigs when adjusted to a 25 or 32 mm gap.

Acknowledgements

Strategic program funding provided by Sask Pork, Alberta Pork, the Manitoba Pork council, and the Sask. Ag. Dev. Fund. Direct funding from the Pig Improvement Co. of Franklin, KY is greatly appreciated.

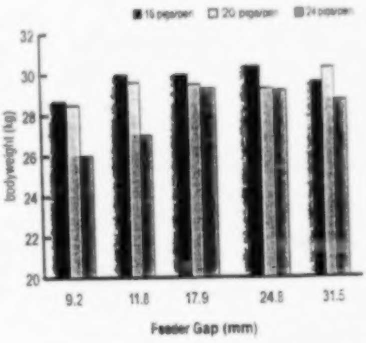

Figure 4 The impact of treatment on final (d42) weight of pigs. There was an interaction of feeder adjustment and group size/density ($P < 0.05$). 16 pigs per pen provided 3.75 square feet per pig; 20 pigs per pen provided 3.0 square feet per pig and 24 pigs per pen provided 2.5 square feet per pig.

Table 1 The impact of feeder gap and group size/density on pig performance, feeder characteristics, time spent eating and lesion scores.

	Feeder Gap, mm					Pig Density, ft²/pig				Significant
	9.2	11.8	17.9	24.8	31.5	2.5	3.0	3.75	SEM	Effects[1]
Weight, kg										
Initial	6.96	7.10	7.12	7.18	7.03	7.03	7.10	7.09	0.044	ns
Final	27.9	28.9	29.5	29.5	29.56	28.0	29.3	29.6	0.093	F, D
	1	7	5	0		3	9	9		FxD
Daily Gain, kg/d	0.48	0.52	0.53	0.52	0.53	0.50	0.52	0.53	0.002	F, D
Feed Intake, kg/d	0.72	0.75	0.78	0.77	0.78	0.74	0.77	0.79	0.005	F, D
Gain: Feed	0.66	0.69	0.68	0.67	0.68	0.67	0.68	0.68	0.004	ns
Feeder										
Area Clear, %	94.1	88.0	62.6	31.8	8.8	51.9	53.8	59.0	2.28	F
Feed Depth, cm	0.06	0.04	0.30	0.69	1.27	0.48	0.50	0.44	0.028	F
Total Duration of eating, min/pig d										
Days 3-6	142	118	125	116	116	122	127	121	5.99	F, FxD
Days 39-42	97	90	85	79	75	82	85	88	8.93	ns
Skin lesion score[2]	0.06	0.04	0.04	0.05	0.05	0.05	0.05	0.03	0.001	ns

[1] Effect of F (feeder adjustment), D (group size/density), or F x D, significant if $P < 0.05$.

[2] The mean score for belly, ears, body and tail. A score of 0 indicated no lesion, 2 indicated severe lesions

ENTERPRISE RETURNS MODULE

Project 01-0

Revenues	17.9mm Feeder Gap	31.5mm Feeder Gap	Difference
Market Hogs	2,027,044	2,025,975	-$0.08
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	**2,087,552**	**2,086,483**	-$0.08

Capital Asset Values	17.9mm Feeder Gap	31.5mm Feeder Gap	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nursery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,009,338**	**5,009,338**	$0.00

Size of Operations (Sows)	17.9mm Feeder Gap	31.5mm Feeder Gap	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	97,958	97,585	$0.03
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	359,902	$0.00
Total Feed	758,518	758,145	$0.03

	17.9mm Feeder Gap	31.5mm Feeder Gap	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	**48,671**	**48,671**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,016	53,017	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	**717,861**	**717,861**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	17.9mm Feeder Gap	31.5mm Feeder Gap
Operating Interest	22,963	22,956
Total Operating	1,317,609	1,317,229
Total Costs	2,035,470	2,035,091
	5 Year Average Feed Cost	
Gross Margin	769,943	769,254
Net Earnings	52,082	51,393
EBITDA	622,203	621,514
ROA	1.04%	1.03%
EBITDA/Sales	29.81%	29.79%
Net Earnings per Hog	$3.80	$3.75

Hog pool price/ckg	$140.00	$140.00

Difference ($0.05)

ENTERPRISE RETURNS MODULE

Project 01-01

Revenues:	17.9mm Feeder Gap	9.2mm Feeder Gap	Difference
Market Hogs	2,027,044	1,986,550	-$2.96
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,047,058	-$2.96

Capital Asset Values	17.9mm Feeder Gap	9.2mm Feeder Gap	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	17.9mm Feeder Gap	9.2mm Feeder Gap	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	97,958	90,593	$0.54
Grower Diets	169,719	168,022	$0.12
Finisher Diets	359,902	356,303	$0.26
Total Feed	758,518	745,856	$0.92

	17.9mm Feeder Gap	9.2mm Feeder Gap	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,016	52,908	$0.01
Property tax	15,747	15,747	$0.00
Total Fixed Costs	717,861	717,752	$0.01

5 Year Average Feed Cost		
Size of Operations (Sows)	17.9mm Feeder Gap	9.2mm Feeder Gap
Operating Interest	22,963	22,738
Total Operating	1,317,609	1,304,723
Total Costs	2,035,470	2,022,475
	5 Year Average Feed Cost	
Gross Margin	769,943	742,335
Net Earnings	52,082	24,583
EBITDA	622,203	594,705
ROA	1.04%	0.49%
EBITDA/Sales	29.81%	29.05%
Net Earnings per Hog	$3.80	$1.80

Hog pool price/ckg	$140.00	$140.00

Difference ($2.01)

ENTERPRISE RETURNS MODULE

Project 01-0

Revenues	17.9mm Feeder Gap	31.5mm Feeder Gap	Difference
Market Hogs	2,027,044	2,025,975	-$0.09
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,086,483	-$0.09

Capital Asset Values	17.9mm Feeder Gap	31.5mm Feeder Gap	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	17.9mm Feeder Gap	31.5mm Feeder Gap	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	97,958	97,585	$0.03
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	359,902	$0.00
Total Feed	758,518	758,145	$0.03

	17.9mm Feeder Gap	31.5mm Feeder Gap	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,016	53,017	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	717,861	717,861	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	17.9mm Feeder Gap	31.5mm Feeder Gap
Operating Interest	22,963	22,956
Total Operating	1,317,609	1,317,229
Total Costs	2,035,470	2,035,091
	5 Year Average Feed Cost	
Gross Margin	769,943	769,254
Net Earnings	52,082	51,393
EBITDA	622,203	621,514
ROA	1.04%	1.03%
EBITDA/Sales	29.81%	29.79%
Net Earnings per hog	$3.8[illegible]	$3.7[illegible]

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.0[illegible]

ENTERPRISE RETURNS MODULE

Project 01-0

Revenues	17.9mm Feeder Gap	9.2mm Feeder Gap	Difference
Market Hogs	2,027,044	1,986,550	-$2.96
Weaners/weaning			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,047,058	-$2.96

Capital Asset Values	17.9mm Feeder Gap	9.2mm Feeder Gap	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	17.9mm Feeder Gap	9.2mm Feeder Gap	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	97,958	90,593	$0.54
Grower Diets	169,719	168,022	$0.12
Finisher Diets	359,902	356,303	$0.26
Total Feed	758,518	745,856	$0.92

	17.9mm Feeder Gap	9.2mm Feeder Gap	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,016	52,908	$0.01
Property tax	15,747	15,747	$0.00
Total Fixed Costs	717,861	717,752	$0.01

5 Year Average Feed Cost		
Size of Operations (Sows)	17.9mm Feeder Gap	9.2mm Feeder Gap
Operating Interest	22,963	22,738
Total Operating	1,317,609	1,304,723
Total Costs	2,035,470	2,022,475
	5 Year Average Feed Cost	
Gross Margin	769,943	742,335
Net Earnings	52,082	24,583
EBITDA	622,203	594,705
ROA	1.04%	0.49%
EBITDA/Sales	29.81%	29.05%
Net Earnings per Hog	$3.80	$1.80

Hog pool price/ckg	$140.00	$140.00

Difference $2.01

ENTERPRISE RETURNS MODULE

Project 01-01

Revenues	17.9mm Feeder Gap	24.8mm Feeder Gap	Difference
Market Hogs	2,027,044	2,014,902	-$0.89
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,075,411	-$0.89

Capital Asset Values	17.9mm Feeder Gap	24.8mm Feeder Gap	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	17.9mm Feeder Gap	24.8mm Feeder Gap	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	97,958	97,280	$0.05
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	355,824	$0.30
Total Feed	758,518	753,762	$0.35

	17.9mm Feeder Gap	24.8mm Feeder Gap	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc. Supplies	404,575	404,575	$0.00
Labour:	482,883	482,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,016	53,013	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	717,861	717,857	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	17.9mm Feeder Gap	24.8mm Feeder Gap
Operating Interest	22,963	22,879
Total Operating	1,317,609	1,312,769
Total Costs	2,035,470	2,030,626
	5 Year Average Feed Cost	
Gross Margin	769,943	762,642
Net Earnings	52,082	44,785
EBITDA	622,203	614,906
ROA	1.04%	0.89%
EBITDA/Sales	29.81%	29.63%
Net Earnings per Hog	$3.80	$3.27

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.53)

ENTERPRISE RETURNS MODULE

Project 01-01

Revenues:	17.9mm Feeder Gap	11.8mm Feeder Gap	Difference
Market Hogs	2,027,044	2,011,748	-$1.12
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	**2,087,552**	**2,072,256**	-$1.12

Capital Asset Values	17.9mm Feeder Gap	11.8mm Feeder Gap	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,009,338**	**5,009,338**	$0.00

Size of Operations (Sows)	17.9mm Feeder Gap	11.8mm Feeder Gap	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	97,958	90,593	$0.54
Grower Diets	169,719	168,022	$0.12
Finisher Diets	359,902	356,303	$0.26
Total Feed	758,518	745,856	$0.92

	17.9mm Feeder Gap	11.8mm Feeder Gap	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	**48,671**	**48,671**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,016	52,976	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	**717,861**	**717,821**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	17.9mm Feeder Gap	11.8mm Feeder Gap
Operating Interest	22,963	22,738
Total Operating	1,317,609	1,304,723
Total Costs	2,035,470	2,022,544
	5 Year Average Feed Cost	
Gross Margin	769,943	767,533
Net Earnings	52,082	49,713
EBITDA	622,203	619,834
ROA	1.04%	0.99%
EBITDA/Sales	29.81%	29.91%
Net Earnings per Hog	$3.80	$3.63

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.17)

ENTERPRISE RETURNS MODULE

Project 01-0[illegible]

Revenues	17.9mm Feeder Gap	24.8mm Feeder Gap	Difference
Market Hogs	2,027,044	2,014,902	-$0.89
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,075,411	-$0.89
Capital Asset Values:	17.9mm Feeder Gap	24.8mm Feeder Gap	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00
Size of Operations (Sows)	17.9mm Feeder Gap	24.8mm Feeder Gap	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	97,958	97,280	$0.05
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	355,824	$0.30
Total Feed	758,518	753,762	$0.35
	17.9mm Feeder Gap	24.8mm Feeder Gap	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,954	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,016	53,013	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	717,861	717,857	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	17.9mm Feeder Gap	24.8mm Feeder Gap
Operating Interest	22,963	22,879
Total Operating	1,317,609	1,312,769
Total Costs	2,035,470	2,030,626
	5 Year Average Feed Cost	
Gross Margin	769,943	762,642
Net Earnings	52,082	44,785
EBITDA	622,203	614,906
ROA	1.04%	0.89%
EBITDA/Sales	29.81%	29.63%
Net Earnings per Hog	$3.8[illegible]	$3.3[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference	($0.5[illegible])

ENTERPRISE RETURNS MODULE

Project 01-01

Revenues:	17.9mm Feeder Gap	11.8mm Feeder Gap	Difference
Market Hogs	2,027,044	2,011,748	-$1.12
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	**2,087,552**	**2,072,256**	-$1.12

Capital Asset Values	17.9mm Feeder Gap	11.8mm Feeder Gap	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nursery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,009,338**	**5,009,338**	$0.00

Size of Operations (Sows)	17.9mm Feeder Gap	11.8mm Feeder Gap	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	97,956	90,593	$0.54
Grower Diets	169,719	168,022	$0.12
Finisher Diets	359,902	356,303	$0.26
Total Feed	758,518	745,856	$0.92

	17.9mm Feeder Gap	11.8mm Feeder Gap	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	**48,671**	**48,671**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,016	52,976	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	**717,861**	**717,821**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	17.9mm Feeder Gap	11.8mm Feeder Gap
Operating Interest	22,963	22,738
Total Operating	1,317,609	1,304,723
Total Costs	2,035,470	2,022,544
	5 Year Average Feed Cost	
Gross Margin	769,943	767,533
Net Earnings	52,082	49,712
EBITDA	622,203	619,834
ROA	1.04%	0.99%
EBITDA/Sales	29.81%	29.91%
Net Earnings per Hog	$3.80	$3.63

Hog pool price/ckg	$140.00	$140.00

Difference ($0.17)

Response to Dietary Energy Concentration and Stocking Density in Weaned Pigs

Crystal L. Levesque[1] *M.Sc.*, **John. F. Patience** *Ph.D.*, **Eduardo Beltranena** *Ph.D.*, **Ruurd T. Zijlstra** *Ph.D.*

Summary

Understanding the effect of energy intake on growth performance and body composition of pigs is critical for the development of economical feeding strategies. However, knowledge is limited on the influence of varying amounts of DE content on growth and body composition according to the growth potential of the pig. A study was conducted to examine the effect of increasing dietary digestible energy (DE) concentration on weaned pig performance at the farm level. Results indicate that higher dietary DE concentration may not improve weaned pig performance.

Introduction

Gut capacity is assumed to be the primary limitation to growth in the young pig because it limits their daily energy intake. Thus, concentrating dietary DE has been assumed to be an effective way to overcome this limitation in gut size. However, increasing dietary DE concentration increases the cost of the diet. In a previous study, increasing DE concentration did not result in improved pig performance. This lack of response to increased dietary DE may have been due to the absence of external stressors. Commercial groups of pigs are under additional stressors such as crowding. Crowding is known to negatively affect pig performance. Concentrating dietary DE may have a greater impact on weaned pig performance in the presence of external stressors.

Experimental procedure

Piglet response to dietary DE concentration and stocking density was studied in 600 pigs weaned at 19 days of age. Pigs were assigned to a low (3.75 ft²/pig) or a high (2.50 ft²/pig) stocking density and one of five dietary DE concentrations (3.19, 3.33, 3.47, 3.61, 3.75 Mcal DE/kg). Pigs received commercial starter diets from 19 to 25 days of age and experimental diets from 25 to 53 days of age. Body weight and feed disappearance were measured weekly. Cost per kg of gain was calculated using overall gain and feed intake.

Results

Final pig body weight (20.25 kg ± 0.06 SEM) was not affected by diet or stocking density. However, from 46 to 53 days of age, pigs at the low stocking density had higher feed intake (0.93 vs. 0.88 kg/d) and higher daily gain (0.67 vs. 0.62 kg/d) than crowded pigs. Feed intake decreased (0.64, 0.64, 0.63, 0.63, 0.59 kg/d) and feed efficiency (0.74, 0.75, 0.78, 0.79, 0.80) improved with increasing dietary DE concentration. Overall, piglet gain did not improve with increased dietary DE concentration, regardless of stocking density. Cost per kg of gain was greatest for the highest DE diet (0.48, 0.50, 0.50, 0.50, 0.51 $/kg gain).

Conclusions

A high stocking density can negatively impact piglet performance. In this study, crowded pigs had a 9.2% slower growth rate than the uncrowded pigs during the last week of the experiment. The weanling pig was able to compensate for reduced dietary DE through increased feed intake. Growth limitations in the weanling pig are not overcome simply be increasing dietary DE concentration. The increased cost of the high DE diets and hence increased cost per kg of gain may not justify the use of higher DE diets in weaner pigs.

Acknowledgements

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***Table 1.* Pig performance and cost of gain from 25 to 53 d of age**

DE level, Mcal DE/kg	3.19	3.33	3.46	3.61	3.75
ADG, kg/d	0.47	0.47	0.48	0.49	0.47
ADFI, kg/d*	0.64	0.64	0.63	0.63	0.59
Feed efficiency**	0.75	0.76	0.78	0.79	0.80
$/tonne^a	352.15	368.51	380.27	391.49	404.41
$/kg gain^a	0.48	0.50	0.50	0.50	0.51

^a Cost in $/tonne and $/kg gain was calculated using the following ingredient prices – wheat: $110.00; barley: $85.00; Soybean meal: $328.00

* $P < 0.05$. ** $P < 0.001$

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[1] PSCI and Department of Animal and Poultry Science, University of Saskatchewan

ENTERPRISE RETURNS MODULE

Project 01-0

Revenues:	3,181 DE Level	3,750 DE Level	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	p	49,575	#VALUE!
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,037,977	2,087,552	$3.62

Capital Asset Values:	3,181 DE Level	3,750 DE Level	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	3,181 DE Level	3,750 DE Level	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	185,486	197,383	-$0.87
Grower Diets	167,838	167,838	$0.00
Finisher Diets	306,506	306,506	$0.00
Total Feed	790,768	802,666	-$0.87

	3,181 DE Level	3,750 DE Level	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	182,883	182,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,242	53,274	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,086	718,118	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	3,181 DE Level	3,750 DE Level
Operating Interest	23,535	23,746
Total Operating	1,350,432	1,362,540
Total Costs	2,068,518	2,080,658
	5 Year Average Feed Cost	
Gross Margin	687,546	725,012
Net Earnings	(30,541)	6,894
EBITDA	539,580	577,015
ROA	-0.61%	0.14%
EBITDA/Sales	26.48%	27.64%
Net Earnings per Hog	($2.23)	$0.50

Hog pool price/ckg	$140.00	$140.00
	Difference	$2.73

ENTERPRISE RETURNS MODULE

Project 01-0

Revenues:	3,181 DE Level	3,750 DE Level	Difference
Market Hogs	2,027,044	2,027,044	$0.0
Weaners/weanlings			$0.0
Cull Sows	0	49,575	#VALUE
Cull Boars	420	420	$0.0
Manure Sales	10,514	10,514	$0.0
			$0.0
Total Revenues	2,037,977	2,087,552	$3.6

Capital Asset Values	3,181 DE Level	3,750 DE Level	
Farrowing Facilities	1,766,885	1,766,885	$0.0
Nureserv Facilities	815,826	815,826	$0.0
Grower Facilities	909,985	909,985	$0.0
Finisher Facilities	1,258,842	1,258,842	$0.0
Sows	244,000	244,000	$0.0
Boars	13,800	13,800	$0.0
Total Value of Assets	5,009,338	5,009,338	$0.0

Size of Operations (Sows)	3,181 DE Level	3,750 DE Level	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.0
Nursery Diets	185,486	197,383	-$0.8
Grower Diets	167,838	167,838	$0.0
Finisher Diets	306,506	306,506	$0.0
Total Feed	790,768	802,666	-$0.8

	3,181 DE Level	3,750 DE Level	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.0
Replacement Boars	6,900	6,900	$0.0
Veterinary, Medicine & Supplies	34,232	34,232	$0.0
Maintenenace & Repairs	49,568	49,568	$0.0
Utilities	88,047	88,047	$0.0
Office Supplies	3,423	3,423	$0.0
Marketing & Transportation	68,464	68,464	$0.0
AI Supplies	6,162	6,162	$0.0
Barn Supplies	20,539	20,539	$0.0
Management and Consulting Fees	21,635	21,635	$0.0
Other Misc Costs	685	685	$0.0
Total Misc & Supplies	404,575	404,575	$0.0
Labour:	82,883	82,883	$0.0
Manure Handling	31,226	31,226	$0.0
Water Consumption	17,445	17,445	$0.0
Water and Manure Handling:	48,671	48,671	$0.0

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.0
Interest and Deprec: Nursery	93,941	93,941	$0.0
Interest and Deprec: Grower	104,588	104,588	$0.0
Interest and Deprec: Finisher	144,891	144,891	$0.0
Management Salaries	94,723	94,723	$0.0
Insurance	53,242	53,274	$0.0
Property tax	15,747	15,747	$0.0
Total Fixed Costs	718,086	718,118	$0.0

5 Year Average Feed Cost		
Size of Operations (Sows	3,181 DE Level	3,750 DE Level
Operating Interest	23,535	23,746
Total Operating	1,350,432	1,362,540
Total Costs	2,068,518	2,080,658
	5 Year Average Feed Cost	
Gross Margin	687,546	725,012
Net Earnings	(30,541)	6,894
EBITDA	539,580	577,015
ROA	-0.61%	0.14%
EBITDA/Sales	26.48%	27.64%
Net Earnings per Hog	($2.2	$0.5

Hog pool price/ckg	$140.00	$140.00
	Difference	$2.7

ENTERPRISE RETURNS MODULE

Project 01-02

Revenues:	3.181 DE Level	3.460 DE Level	Difference
Market Hogs	2,027,044	2,030,703	$0.27
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,091,211	$0.27
Capital Asset Values:	3.181 DE Level	3.460 DE Level	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00
Size of Operations (Sows)	3.181 DE Level	3.460 DE Level	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	185,486	192,121	-$0.48
Grower Diets	167,838	167,838	$0.00
Finisher Diets	306,506	306,506	$0.00
Total Feed	790,768	797,404	-$0.48
	3.181 DE Level	3.460 DE Level	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,242	53,260	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,086	718,104	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.181 DE Level	3.460 DE Level
Operating Interest	23,535	23,653
Total Operating	1,350,432	1,357,185
Total Costs	2,068,518	2,075,289
	5 Year Average Feed Cost	
Gross Margin	737,120	734,026
Net Earnings	19,034	15,922
EBITDA	589,155	586,043
ROA	0.38%	0.32%
EBITDA/Sales	28.22%	28.02%
Net Earnings per Hog	$1.39	$1.16

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.23)

ENTERPRISE RETURNS MODULE

Project 01-02

Revenues:	3,181 DE Level	3,330 DE Level	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,087,552	$0.00

Capital Asset Values:	3,181 DE Level	3,330 DE Level	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	3,181 DE Level	3,330 DE Level	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	185,486	188,500	-$0.22
Grower Diets	167,838	167,838	$0.00
Finisher Diets	306,506	306,506	$0.00
Total Feed	790,768	793,782	-$0.22

	3,181 DE Level	3,330 DE Level	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc. Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,242	53,260	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,086	718,104	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3,181 DE Level	3,330 DE Level
Operating Interest	23,535	23,588
Total Operating	1,350,432	1,353,499
Total Costs	2,068,518	2,071,604
	5 Year Average Feed Cost	
Gross Margin	737,120	734,053
Net Earnings	19,034	15,948
EBITDA	589,155	586,070
ROA	0.38%	0.32%
EBITDA/Sales	28.22%	28.07%
Net Earnings per Hog	$1.39	$1.16

Hog pool price/ckg	$140.00	$140.00

Difference ($0.23)

ENTERPRISE RETURNS MODULE

Project 01-0

Revenues	3,181 DE Leve	3,460 DE Leve	Difference
Market Hog	2,027,044	2,030,703	$0.27
Weaners/weaning			$0.00
Cull Sow	49,575	49,575	$0.00
Cull Boar	420	420	$0.00
Manure Sale	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,091,211	$0.27

Capital Asset Values	3,181 DE Leve	3,460 DE Leve	
Farrowing Facilitie	1,766,885	1,766,885	$0.00
Nursery Facilitie	815,826	815,826	$0.00
Grower Facilitie	909,985	909,985	$0.00
Finisher Facilitie	1,258,842	1,258,842	$0.00
Sow	244,000	244,000	$0.00
Boar	13,800	13,800	$0.00
Total Value of Asset	5,009,338	5,009,338	$0.00

Size of Operations (Sows	3,181 DE Leve	3,460 DE Leve	
Feed: Average Feed Cost	5 Year Average Feed Cost		
Sow and Boar Diet	130,939	130,939	$0.00
Nursery Diet	185,486	192,121	-$0.48
Grower Diet	167,838	167,838	$0.00
Finisher Diet	306,506	306,506	$0.00
Total Feed	790,768	797,404	-$0.48

	3,181 DE Leve	3,460 DE Leve	
Misc. Costs			
Replacement Gilt	104,920	104,920	$0.00
Replacement Boar	6,900	6,900	$0.00
Veterinary, Medicine & Supplie	34,232	34,232	$0.00
Maintenenace & Repair	49,568	49,568	$0.00
Utilitie	88,047	88,047	$0.00
Office Supplie	3,423	3,423	$0.00
Marketing & Transportatio	68,464	68,464	$0.00
AI Supplie	6,162	6,162	$0.00
Barn Supplie	20,539	20,539	$0.00
Management and Consulting Fee	21,635	21,635	$0.00
Other Misc Cost	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumptio	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs			
Interest and Deprec: Farrowin	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,586	104,586	$0.00
Interest and Deprec: Finishe	144,891	144,891	$0.00
Management Salarie	94,723	94,723	$0.00
Insurance	53,242	53,260	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,086	718,104	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	3,181 DE Leve	3,460 DE Leve
Operating Interest	23,535	23,651
Total Operating	1,350,432	1,357,185
Total Costs	2,068,518	2,075,289
	5 year Average Feed Cost	
Gross Margin	737,120	734,026
Net Earnings	19,034	15,921
EBITDA	589,155	586,043
ROA	0.38%	0.32%
EBITDA/Sales	28.22%	28.02%
Net Earnings per Hog	$1.35	$1.1

Hog pool price/ckg $140.00 $140.00

Difference ($0.2

ENTERPRISE RETURNS MODULE

Project 01-01

Revenues	3,181 DE Level	3,330 DE Level	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,087,552	$0.00

Capital Asset Values	3,181 DE Level	3,330 DE Level	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	3,181 DE Level	3,330 DE Level	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	185,486	188,500	-$0.22
Grower Diets	167,838	167,838	$0.00
Finisher Diets	306,506	306,506	$0.00
Total Feed	790,768	793,782	-$0.22

	3,181 DE Level	3,330 DE Level	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,242	53,260	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,086	718,104	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	3,181 DE Level	3,330 DE Level
Operating Interest	23,535	23,588
Total Operating	1,350,432	1,353,499
Total Cost	2,068,518	2,071,604
	5 Year Average Feed Cost	
Gross Margin	737,120	734,052
Net Earnings	19,034	15,948
EBITDA	589,155	586,070
ROA	0.38%	0.32%
EBITDA/Sales	28.22%	28.07%
Net Earnings per Hog	$1.35	$1.13

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.22)

ENTERPRISE RETURNS MODULE

Revenues	3.181 DE Level	3.610 DE Level	Difference
Market Hogs	2,027,044	2,033,115	$0.44
Weaners/weaning			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,093,624	$0.44
Capital Asset Values:	3.181 DE Level	3.610 DE Level	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nursery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00
Size of Operations (Sows)	3.181 DE Level	3.610 DE Level	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	185,486	198,095	-$0.92
Grower Diets	167,838	167,838	$0.00
Finisher Diets	306,506	306,506	$0.00
Total Feed	790,768	803,378	-$0.92
	3.181 DE Level	3.610 DE Level	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	182,883	182,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,242	53,281	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,086	718,125	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	3.181 DE Level	3.610 DE Level
Operating Interest	23,535	23,759
Total Operating	1,350,432	1,363,265
Total Costs	2,068,518	2,081,390
	5 Year Average Feed Cost	
Gross Margin	737,120	730,359
Net Earnings	19,034	12,234
EBITDA	589,155	582,355
ROA	0.38%	0.24%
EBITDA/Sales	28.22%	27.82%
Net Earnings per Hog	$1.39	$0.89

Hog pool price/ckg	$140.00	$140.00

Difference ($0.50)

ENTERPRISE RETURNS MODULE

Revenues	3.181 DE Level	3.610 DE Level	Difference
Market Hogs	2,027,044	2,033,115	$0.44
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,514	$0.00
			$0.00
Total Revenues	2,087,552	2,093,624	$0.44

Capital Asset Values:	3.181 DE Level	3.610 DE Level	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	3.181 DE Level	3.610 DE Level	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	185,486	198,095	-$0.92
Grower Diets	167,838	167,838	$0.00
Finisher Diets	306,506	306,506	$0.00
Total Feed	790,768	803,378	-$0.92

	3.181 DE Level	3.610 DE Level	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	482,883	482,883	$0.00
Manure Handling	31,226	31,226	$0.00
Water Consumption	17,445	17,445	$0.00
Water and Manure Handling:	48,671	48,671	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,242	53,281	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,086	718,125	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.181 DE Level	3.610 DE Level
Operating Interest	23,535	23,759
Total Operating	1,350,432	1,363,265
Total Costs	2,068,518	2,081,390
	5 Year Average Feed Cost	
Gross Margin	737,120	730,359
Net Earnings	19,034	12,234
EBITDA	589,155	582,355
ROA	0.38%	0.24%
EBITDA/Sales	28.22%	27.82%
Net Earnings per Hog	$1.39	$0.89

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.50)

Effect of Gender and Crowding on Variation in Days to Market

Dana R. Cooper *M.Sc.*, John F. Patience *Ph.D.*, Harold W. Gonyou *Ph.D.* and Ruurd T. Zijlstra *Ph.D.*

Summary

Marketing strategies are affected by variation in days to market within groups of pigs. This study determined effects of gender and crowding on variation in body weight (BW) gain and days to market. Pigs were marketed individually at an identical market weight resulting in uniform carcass characteristics. Crowding did not increase variation; however, pigs marketed first were the heaviest pigs when traced back to farrowing. Thus, raising the growth curve of all pigs may be more practical than reducing variation. The latter appears very difficult on most farms.

Introduction

Managing variation in the production chain is receiving increasing attention. The economic impact of variation when marketing groups of pigs is enormous, yet few research programs focus on this issue. Uniformity of pigs reaching market weight may be affected by variation in growth caused by gender or crowding during the entire grower-finisher phase.

Experimental Procedures

At weaning, 493 pigs were assigned randomly within gender to a pen containing either 16 pigs/pen (0.35 m^2/pig; Control) or 21 pigs/pen (0.26 m^2/pig; Crowded). In the grow-finish room, pigs were allowed 0.88 m^2/pig (Control) or 0.67 m^2/pig (Crowded). Pigs were weighed at birth, days 21, 56, 77, 112, and 140 of age, and at market (~ 115 kg).

Results and Discussion

Crowding did not affect BW until day 77 when Control pigs were 1.6 kg heavier than Crowded pigs (Table 1). Gender did not affect BW until day 56 when barrows were 2.7 kg heavier than gilts. Coefficient of variation (CV) for BW at day 140 or days to market was not affected by gender or crowding. Together, results indicate that crowding reduced mean BW gain, but not variation around the mean. Marketing individual pigs at a specific BW resulted in similar carcasses between Control and Crowded pigs (Table 1). Overall, for an extra kg BW at weaning, 1.9 kg extra was gained at day 56 (8 wk), 2.4 kg extra at day 77 (10 wk), and 4.2 kg extra at day 140 (20 wk; Figure 1), indicating the importance of increasing weaning weight.

Implications

Marketing strategies should be developed based on variation within groups of pigs. Holding gilts longer than barrows may improve market value of a group. Less crowding reduced days to market (115 kg) by four days. Barrows reached market weight six days earlier than gilts.

Acknowledgements

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund.

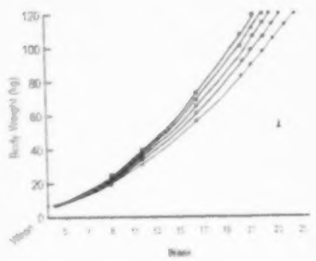

Figure 1. Growth curves of pigs marketed at 21, 22, 23, 24, and 25 weeks of age.

Table 1. Effect of gender and crowding on performance variables

	Barrows		Gilts	
Item	Control	Crowded	Control	Crowded
BW, kg				
day 0	1.5	1.5	1.4	1.4
day 21	5.4	5.3	5.3	5.3
day 56	19.9	18.7	19.7	19.5
day 77^{b}	30.6	28.9	30.7	29.2
day 112^{ab}	61.0	60.4	59.1	56.9
day 140^{ab}	96.4	93.1	90.9	89.2
CV	8.0	8.9	10.8	9.3
Days to market^{a}	156.9	160.1	161.0	165.1
CV	5.1	5.0	12.5	4.8
Carcass characteristics				
Dressing %	90.4	89.9	91.0	90.6
Fat, mm^{a}	23.7	21.8	18.0	18.7
Lean, mm^{a}	52.3	52.5	58.0	56.8
Index^{a}	107.4	108.3	113.4	112.9

^{a}Gender effect ^{b}Crowding effect

ENTERPRISE RETURNS MODULE

Project 01-01

Revenues	0.35 square meters	0.26 square meters	Difference
Market Hogs	2,063,899	2,006,559	-$4.11
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,067,214	-$4.11

Capital Asset Values	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	170,889	164,459	$0.46
Finisher Diets	306,776	297,851	$0.64
Total Feed	807,465	780,741	$1.92
	57.92		

	0.35 square meters	0.26 square meters	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	0.35 square meters	0.26 square meters
Operating Interest	23,909	23,435
Total Operating	1,371,902	1,344,704
Total Costs	2,092,418	2,065,220
	5 Year Average Feed Cost	
Gross Margin	752,652	722,510
Net Earnings	32,136	1,994
EBITDA	604,335	574,193
ROA	0.64%	0.04%
EBITDA/Sales	28.45%	27.78%
Net Earnings per Hog	$2.30	$0.14

Hog pool price/ckg	$140.00	$140.00

Difference $2.16

ENTERPRISE RETURNS MODULE

Project 01-03

Revenues:	0.35 square meters	0.26 square meters	Difference
Market Hogs	2,063,899	2,006,559	-$4.11
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,067,214**	-$4.11
Capital Asset Values:	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	170,889	164,459	$0.46
Finisher Diets	306,776	297,851	$0.64
Total Feed	807,465	780,741	$1.92
	57.92		
	0.35 square meters	0.26 square meters	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	0.35 square meters	0.26 square meters
Operating Interest	23,909	23,435
Total Operating	1,371,902	1,344,704
Total Costs	2,092,418	2,065,220
	5 Year Average Feed Cost	
Gross Margin	752,652	722,510
Net Earnings	32,136	1,994
EBITDA	604,335	574,193
ROA	0.64%	0.04%
EBITDA/Sales	28.45%	27.78%
Net Earnings per Hog	$2.30	$0.14

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.16)

The Effect of Ergot on the Performance of Weanling Pigs

T.F. Oresanya[1] *M.Sc.*, J.F. Patience *Ph.D.*, R.T. Zijlstra *Ph.D.*, A.D. Beaulieu *Ph.D.*, D.M. Middleton[2] *Ph.D.*, B.R. Blakley[3] *Ph.D.*, and D.A. Gillis *M.Sc.*

Summary

Ergot contains numerous poisonous substances (alkaloids), which upon ingestion by animals may lead to poor growth rate, decreased feed consumption and poor feed efficiency. The effect will depend on the age or physiological stage of the animal, and the amount consumed. Results obtained in this study indicate that the consumption of diets containing more than 0.10% high alkaloid ergot by weanling pigs severely reduces growth rate, and feed consumption and efficiency.

Introduction

Ergot infection in cereal grains, especially wheat, is of great economic importance. An ergot infection may not result in reduced grain yield but will reduce quality due to the replacement of grain kernels with a number of poisonous alkaloid-containing ergot sclerotia. These grains may end up as feedstuff in swine diets. Ergot ingestion may impair growth and development. Also, the plasma concentration of certain hormones, especially prolactin, may be reduced. Information is lacking on the safe inclusion level of ergot in the diet of the weanling pig. This experiment was conducted to investigate the impact on performance of including ergot-contaminated wheat in the diet of weaned pigs and determine the level that can safely be included in the diet.

Experimental Procedures

Ground ergot sclerotia were added to diets at 0% (control), 0.05%, 0.10%, 0.25%, 0.50%, and 1.00% (weight basis). Ground wheat ergot sclerotia contained 1880 mg alkaloid/kg with ergocristine, ergotamine, ergosine, ergocryptine and ergocornine constituting 40, 36, 11, 7, and 6%.

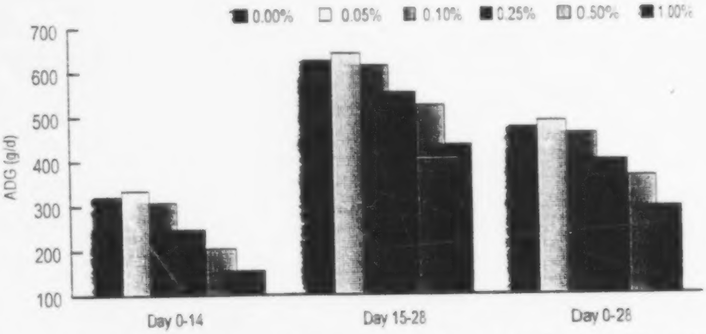

Figure 1 **The effect of level of dietary ergot on ADG of piglets (P < 0.001, all periods).**

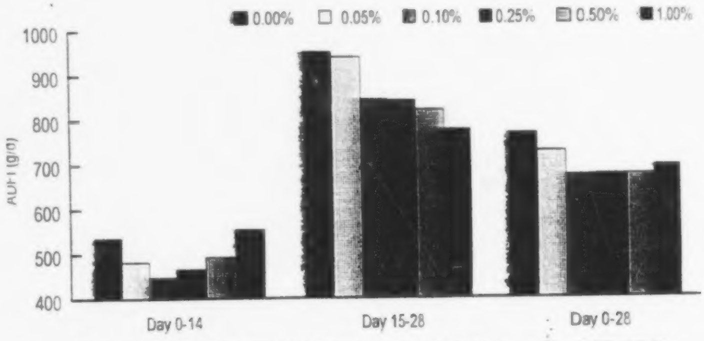

Figure 2 **The effect of level of dietary ergot on ADFI of piglets (P > 0.05, d 0-14; P < 0.05, d 15-28 and d 0-28).**

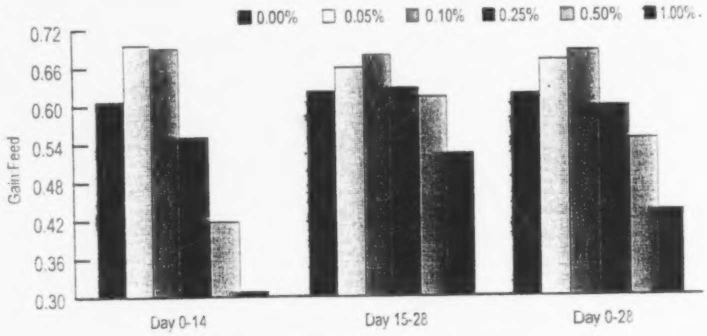

Figure 3 **The effect of level of dietary ergot on feed efficiency of piglets (P < 0.01, all periods).**

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[1] PSCI and Department of Animal and Poultry Science, University of Saskatchewan

[2] Department of Vet. Pathology, University of Saskatchewan

[3] Department of Vet. Biomedical Sciences and the Toxicology Centre, University of Saskatchewan

respectively. Thus, diets contained 0.00, 1.04, 2.07, 5.21, 10.41, and 20.82 mg alkaloid/kg, respectively. Each diet was fed to 8 pens of four pigs (two barrows and two gilts) for four weeks. Average daily gain and feed efficiency were calculated from the performance data. Prolactin analysis was conducted on serum samples collected from pigs on day 28. Regression analysis was used to determine the effect of ergot level on performance and serum prolactin concentration.

Diets containing up to 0.10% ergot can safely be fed to weanling pigs, provided these pigs are not destined for the breeding herd.

Results and Discussion

Nervous signs or cutaneous lesions associated with ergotoxicity were not observed. Average daily gain was similar for pigs that consumed diets up to 0.10% ergot, but was depressed at higher levels (P < 0.001) (Figure 1). The effects were most pronounced in weeks 1 and 2 with pigs fed the 1.00% ergot gaining 82 and 38% less than control (211 vs. 39 g/d, and 432 vs. 269 g/d, week 1 and 2, respectively (Figure 1). Average daily feed intake was decreased over the entire period (P < 0.05) but was unaffected by ergot during weeks 1 and 2 (P > 0.20) (Figure 2). Feed efficiency (gain:feed ratio) was increased at low levels of ergot inclusion but was reduced with ergot levels above 0.10% (0.685 vs. 0.435, 0.10% vs. 1.00%). Serum prolactin concentration was reduced at all levels of ergot (P < 0.0001) (Figure 4). The maximum level of alkaloids that can be included in weanling pig diets without adverse effects on ADG and feed efficiency was 2.31 mg alkaloid/kg. This is based on the alkaloid content and profile of ergot sclerotia used in this study and corresponds to 0.12 g ergot sclerotia per 100 g diet.

Implications

Feeding high levels of ergot alkaloid caused severe reductions in the growth performance of weanling pigs. Prolonged exposure depressed feed intake. Serum prolactin concentration was depressed which indicates that ergot may impair normal mammary gland development in gilts. When the level of ergot in wheat is known, the level that can be used in weanling pig diet can be calculated. For example, wheat contaminated with 1.0% ergot, should not comprise more than 10% of the diet of weanling pigs.

Acknowledgements

Strategic program funding provided by Sask Pork, Alberta Pork, the Manitoba Pork Council, and the Saskatchewan Agriculture and Food Development Fund. Direct funding from the Alberta Agricultural Research Institute (AARI).

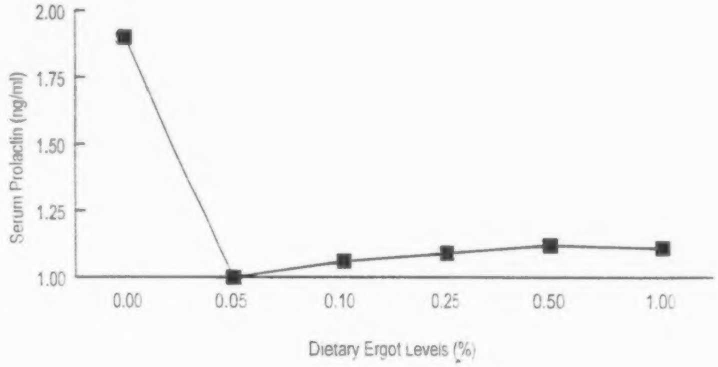

Figure 4 **The effect of level of dietary ergot on serum prolactin concentration of piglets (P < 0.0001).**

ENTERPRISE RETURNS MODULE

Project 01-04

Revenues	No Ergot	0.05% Ergot	Difference
Market Hogs	2.063,899	2.074,330	$0.75
Weaners/weanlings			$0.00
Cull Sows	49.575	49.575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10.660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,134,985	$0.75
Capital Asset Values:	No Ergot	0.05% Ergot	
Farrowing Facilities	1,766.885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925.048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00
Size of Operations (Sows)	No Ergot	0.05% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	222,039	-$1.66
Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	317,931	$0.00
Total Feed	818,620	841,798	-$1.66
	58.72		
	No Ergot	0.05% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	482,883	482,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210.955	210.955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106.877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	722,003	722,003	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	No Ergot	0.05% Ergot
Operating Interest	24.107	24,518
Total Operating	1.383,254	1.406,843
Total Costs	2.105,257	2.128.847
	5 Year Average Feed Cost	
Gross Margin	741,299	728.141
Net Earnings	19,296	6,138
EBITDA	592,863	579,706
ROA	0.38%	0.12%
EBITDA/Sales	27.91%	27.15%
Net Earnings per Hog	$1.38	$0.44

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.94

ENTERPRISE RETURNS MODULE

Project 01-04

Revenues	No Ergot	0.05% Ergot	Difference
Market Hogs	2,063,899	2,074,330	$0.75
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Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,134,985	$0.75

Capital Asset Values	No Ergot	0.05% Ergot	
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Grower Facilities	925,048	925,048	$0.00
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Manure Handling	31,660	31,660	$0.00
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Property tax	16,033	16,033	$0.00
Total Fixed Costs	722,003	722,003	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	No Ergot	0.05% Ergot
Operating Interest	24,107	24,518
Total Operating	1,383,254	1,406,843
Total Costs	2,105,257	2,128,847
	5 Year Average Feed Cost	
Gross Margin	741,299	728,141
Net Earnings	19,296	6,138
EBITDA	592,863	579,706
ROA	0.38%	0.12%
EBITDA/Sales	27.91%	27.15%
Net Earnings per Hog	$1.38	$0.44

Hog pool price/ckg	$140.00	$140.00

Difference: ($0.94)

ENTERPRISE RETURNS MODULE

Project 01-04

Revenues:	No Ergot	0.10% Ergot	Difference
Market Hogs	2,063,899	2,046,453	-$1.25
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,107,108**	-$1.25
Capital Asset Values:	No Ergot	0.10% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	No Ergot	0.10% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	213,308	-$1.04
Grower Diets	170,889	169,180	$0.12
Finisher Diets	306,776	303,708	$0.22
Total Feed	807,465	817,136	-$0.69
	57.92		
	No Ergot	0.10% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	No Ergot	0.10% Ergot
Operating Interest	23,909	24,081
Total Operating	1,371,902	1,381,744
Total Costs	2,092,418	2,102,260
	5 Year Average Feed Cost	
Gross Margin	752,652	725,364
Net Earnings	32,136	4,848
EBITDA	604,335	577,047
ROA	0.64%	0.10%
EBITDA/Sales	28.45%	27.39%
Net Earnings per Hog	$2.30	$0.35

Hog pool price/ckg	$140.00	$140.00
Difference		($1.9573)

ENTERPRISE RETURNS MODULE

Project 01-04

	No Ergot	0.25% Ergot	Difference
Revenues:			
Market Hogs	2,063,899	1,929,812	-$9.62
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	1,990,467	-$9.62

	No Ergot	0.25% Ergot	
Capital Asset Values:			
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	163,923	$2.51
Grower Diets	170,889	162,345	$0.61
Finisher Diets	306,776	291,437	$1.10
Total Feed	807,465	748,644	$4.22
	57.92		

	No Ergot	0.25% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	No Ergot	0.25% Ergot
Operating Interest	23,909	22,866
Total Operating	1,371,902	1,312,037
Total Costs	2,092,418	2,032,554
	5 Year Average Feed Cost	
Gross Margin	752,652	678,430
Net Earnings	32,136	(42,087)
EBITDA	604,335	530,112
ROA	0.64%	-0.84%
EBITDA/Sales	28.45%	26.63%
Net Earnings per Hog	$2.30	($3.02)

Hog pool price/ckg	$140.00	$140.00
	Difference	($5.3237)

ENTERPRISE RETURNS MODULE

Project 01-04

Revenues:	No Ergot	0.10% Ergot	Difference
Market Hogs	2,063,899	2,046,453	-$1.25
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,107,108**	-$1.25
Capital Asset Values:	No Ergot	0.10% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	No Ergot	0.10% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nurserv Diets	198,861	213,308	-$1.04
Grower Diets	170,889	169,180	$0.12
Finisher Diets	306,776	303,708	$0.22
Total Feed	807,465	817,136	-$0.69
	57.92		
	No Ergot	0.10% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
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Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
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Interest and Deprec: Nursery	93,785	93,785	$0.00
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Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	No Ergot	0.10% Ergot
Operating Interest	23,909	24,081
Total Operating	1,371,902	1,381,744
Total Costs	2,092,418	2,102,260
		5 Year Average Feed Cost
Gross Margin	752,652	725,364
Net Earnings	32,136	4,848
EBITDA	604,335	577,047
ROA	0.64%	0.10%
EBITDA/Sales	28.45%	27.39%
Net Earnings per Hog	$2.30	$0.35

Hog pool price/ckg	$140.00	$140.00

Difference ($1.957)

ENTERPRISE RETURNS MODULE

Revenues:	No Ergot	0.25% Ergot	Difference
Market Hogs	2,063,899	1,929,812	-$9.62
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	1,990,467	-$9.62

Capital Asset Values:	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nursery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	No Ergot	0.25% Ergot	
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Finisher Diets	306,776	291,437	$1.10
Total Feed	807,465	748,644	$4.22
	57.92		

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Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	No Ergot	0.25% Ergot
Operating Interest	23,909	22,866
Total Operating	1,371,902	1,312,037
Total Costs	2,092,418	2,032,554
	5 Year Average Feed Cost	
Gross Margin	752,652	678,430
Net Earnings	32,136	(42,087)
EBITDA	604,335	530,112
ROA	0.64%	-0.84%
EBITDA/Sales	28.45%	26.63%
Net Earnings per Hog	$2.30	($3.02)

Hog pool price/ckg	$140.00	$140.00
	Difference	($5.3237)

ENTERPRISE RETURNS MODULE

Project 01-04

Revenues	No Ergot	0.50% Ergot	Difference
Market Hog	2,063,899	1,804,527	-$18.60
Weaners/weaning			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	1,865,182	-$18.60
Capital Asset Values:	No Ergot	0.50% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	No Ergot	0.50% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	137,416	$4.41
Grower Diets	170,889	158,072	$0.92
Finisher Diets	306,776	283,768	$1.65
Total Feed	807,465	710,196	$6.98
	57.92		
	No Ergot	0.50% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	No Ergot	0.50% Ergot
Operating Interest	23,909	22,184
Total Operating	1,371,902	1,272,907
Total Costs	2,092,418	1,993,423
	5 Year Average Feed Cost	
Gross Margin	752,652	592,275
Net Earnings	32,136	(128,242)
EBITDA	604,335	443,958
ROA	0.64%	-2.56%
EBITDA/Sales	28.45%	23.80%
Net Earnings per Hog	$2.30	($9.20)

Hog pool price/ckg	$140.00	$140.00
	Difference	($11.503)

ENTERPRISE RETURNS MODULE

Project 01-04

Revenues:	No Ergot	0.50% Ergot	Difference
Market Hogs	2.063.899	1.804.527	-$18.60
Weaners/weanlings			$0.00
Cull Sows	49.575	49.575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10.660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**1,865,182**	-$18.60
Capital Asset Values:	No Ergot	0.50% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13.800	13.800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	No Ergot	0.50% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	137,416	$4.41
Grower Diets	170,889	158,072	$0.92
Finisher Diets	306,776	283,768	$1.65
Total Feed	807,465	710,196	$6.98
	57.92		
	No Ergot	0.50% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
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Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6.274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22.028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
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Interest and Deprec: Farrowing	210,955	210,955	$0.00
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Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16.033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	No Ergot	0.50% Ergot
Operating Interest	23,909	22,184
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Total Costs	2,092.418	1,993.423
	5 Year Average Feed Cost	
Gross Margin	752.652	592,275
Net Earnings	32,136	(128,242)
EBITDA	604,335	443,958
ROA	0.64%	-2.56%
EBITDA/Sales	28.45%	23.80%
Net Earnings per Hog	$2.30	($9.20)

Hog pool price/ckg	$140.00	-$140.00
	Difference	($11.5033)

Effects of Nipple Drinker Height and Flow Rate on Water Wastage in Grower and Finisher Pigs

Yuzhi Li *Ph.D.* and Harold W. Gonyou *Ph.D.*

Summary

An experiment was conducted to study the effects of height and flow rate of nipple drinkers on water wastage in pigs. Results show water wastage can be reduced by up to 20% by adjusting nipple height. High flow rate resulted in higher water wastage.

Introduction

In our previous study on water wastage, grower/finisher pigs wasted 25% of water from the nipple drinker at standard flow rate (700 ml/min) and height (5 cm higher than the shoulder height of the smallest pig). However, on commercial farms, water wastage from a nipple drinker is reported as high as 40~60%. The difference between these results may partly be attributed to the improper drinker height and flow rate on pig farms. This study focused on effects of drinker height and flow rate on water intake and wastage in grower/finisher pigs.

Materials and Methods

Four pens of eight female pigs were tested during the 12 week study. Water disappearance, water wastage, and feed intake were measured at two stages, i.e. week 1~4 for growers, and week 8~12 for finishers. In each stage, drinkers were set up at two heights, i.e. five cm higher than the shoulders of the smallest pigs in the pen (standard height) or 33 cm (low height). At each drinker height, two flow rates, 500 and 1000 ml/min, were employed. Pigs in each pen were exposed to each treatment combination for one week, and the data were collected during the last four days of the week. Body weight was measured individually at the start of each test and every two weeks thereafter. Feed intake was determined every week on a pen basis.

Results and discussion

Nipple height did not affect feed and water intake in either growers or finishers (Table 1). Water intake was about two times feed intake. The low nipple height increased water wastage by about 10% (from 26% to 35%) in growers and 20% (from 18% to 39%) in finishers. The flow rate of nipple drinkers did not change feed intake and the ratio of water to feed intake (Table 2). Water wastage was increased by about 7% at the higher flow rate in both grower and finisher pigs. The flow rates employed in the study were lower than that usually used on commercial farms. Higher flow rates could result in more water spillage from nipple drinkers. Water wastage at each treatment combination is shown in Table 3.

Conclusion

By adjusting nipple drinker height, water wastage can be reduced by up to 20% in grower/finisher pigs. High flow rate can result in more water spillage from nipple drinkers.

Acknowledgements

Funding for this project was provided by an NSERC/AAFC grant. Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund.

Table 1 **Effect of nipple heights on water intake and wastage**

Stage	Growers		Finishers	
Drinker Height	Standard	Low	Standard	Low
BW, kg	23.5	23.3	68.6	68.5
ADFI, kg/d	1.2	1.3	2.4	2.3
Water disap., L/d	3.3	3.8	5.2	7.2
Water intake, L/d	2.5	2.5	4.2	4.3
Water intake/ADFI, L/kg	2.0	2.0	1.8	1.9
Wastage, %	25.9	34.6	17.7	39.0

Table 2 **Effect of flow rate of nipple drinkers on water wastage**

Stage	Growers		Finishers	
Nipple flow rate	1000 ml/min	500 ml/min	1000ml/min	500 ml/min
Body weight, kg	23.5	23.4	68.6	68.4
Feed intake, kg/d	1.3	1.2	2.4	2.4
Water disap., L/d	4.0	3.2	6.6	5.8
Water intake, L/d	2.6	2.3	4.4	4.1
Water intake/ADFI, L/kg	2.1	1.9	1.9	1.8
Wastage, %	34.0	26.5	31.0	25.7

Table 3 **Water wastage as % of water disappearance by pigs at nipple drinkers**

	Growers		Finishers	
	1000 ml/min	500 ml/min	1000ml/min	500 ml/min
Standard nipple height	29.5	22.2	20.3	15.1
Low nipple height	38.4	30.8	41.8	36.3

ENTERPRISE RETURNS MODULE

Project 01-05

Revenues:	500 ml/min, standard height	500 ml/min, low height	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	11,335	$0.06
			$0.00
Total Revenues	**2,087,552**	**2,088,373**	$0.06

Capital Asset Values:	500 ml/min, standard height	500 ml/min, low height	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,009,338**	**5,009,338**	$0.00

Size of Operations (Sows)	500 ml/min, standard height	500 ml/min, low height	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	359,902	$0.00
Total Feed	794,343	794,343	$0.00

	500 ml/min, standard height	500 ml/min, low height	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	33,665	-$0.18
Water Consumption	17,445	18,935	-$0.11
Water and Manure Handling:	**48,671**	**52,599**	-$0.29
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	**718,235**	**718,235**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	500 ml/min, standard height	500 ml/min, low height
Operating Interest	23,598	23,668
Total Operating	1,354,069	1,358,068
Total Costs	2,072,304	2,076,303
	5 Year Average Feed Cost	
Gross Margin	733,483	730,305
Net Earnings	15,248	12,070
EBITDA	585,369	582,192
ROA	0.30%	0.24%
EBITDA/Sales	28.04%	27.88%
Net Earnings per Hog	$1.11	$0.88

Hog pool price/ckg	$140.00	$140.00
		($0.23

ENTERPRISE RETURNS MODULE

Project 01-05

Revenues	500 ml/min, standard height	1000 ml/min, standard height	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,823	$0.02
			$0.00
Total Revenues	**2,087,552**	**2,087,861**	$0.02

Capital Asset Values:	500 ml/min, standard height	1000 ml/min, standard height	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,009,338**	**5,009,338**	$0.00

Size of Operations (Sows)	500 ml/min, standard height	1000 ml/min, standard height	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	359,902	$0.00
Total Feed	794,343	794,343	$0.00

	500 ml/min, standard height	1000 ml/min, standard height	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	32,143	-$0.07
Water Consumption	17,445	18,005	-$0.04
Water and Manure Handling:	**48,671**	**50,149**	-$0.11

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	**718,235**	**718,235**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	500 ml/min, standard height	1000 ml/min, standard height
Operating Interest	23,598	23,625
Total Operating	1,354,069	1,355,574
Total Costs	2,072,304	2,073,809
	5 Year Average Feed Cost	
Gross Margin	733,483	732,287
Net Earnings	15,248	14,052
EBITDA	585,369	584,174
ROA	0.30%	0.28%
EBITDA/Sales	28.04%	27.98%
Net Earnings per Hog	$1.11	$1.03

Hog pool price/ckg	$140.00	$140.00
		($0.09)

ENTERPRISE RETURNS MODULE

Project 01-05

Revenues:	500 ml/min, standard height	500 ml/min, low height	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	11,335	$0.06
			$0.00
Total Revenues	**2,087,552**	**2,088,373**	$0.06
Capital Asset Values	500 ml/min, standard height	500 ml/min, low height	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,009,338**	**5,009,338**	$0.00
Size of Operations (Sows)	500 ml/min, standard height	500 ml/min, low height	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	359,902	$0.00
Total Feed	794,343	794,343	$0.00
	500 ml/min, standard height	500 ml/min, low height	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	33,665	-$0.18
Water Consumption	17,445	18,935	-$0.11
Water and Manure Handling:	**48,671**	**52,599**	-$0.29
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,235	718,235	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	500 ml/min, standard height	500 ml/min, low height
Operating Interest	23,598	23,668
Total Operating	1,354,069	1,358,068
Total Costs	2,072,304	2,076,303
	5 Year Average Feed Cost	
Gross Margin	733,483	730,305
Net Earnings	15,248	12,070
EBITDA	585,369	582,192
ROA	0.30%	0.24%
EBITDA/Sales	28.04%	27.88%
Net Earnings per Hog	$1.11	$0.88

Hog pool price/ckg	$140.00	$140.00
		($0.23)

ENTERPRISE RETURNS MODULE

Project 01-05

Revenues	500 ml/min, standard height	1000 ml/min, standard height	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	10,823	$0.02
			$0.00
Total Revenues	2,087,552	2,087,861	$0.02

Capital Asset Values	500 ml/min, standard height	1000 ml/min, standard height	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

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Nursery Diets	133,783	133,783	$0.00
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	359,902	$0.00
Total Feed	794,343	794,343	$0.00

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Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	32,143	-$0.07
Water Consumption	17,445	18,005	-$0.04
Water and Manure Handling:	48,671	50,149	-$0.11

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,235	718,235	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	500 ml/min, standard height	1000 ml/min, standard height
Operating Interest	23,598	23,625
Total Operating	1,354,069	1,355,574
Total Costs	2,072,304	2,073,809
	5 Year Average Feed Cost	
Gross Margin	733,483	732,287
Net Earnings	15,248	14,052
EBITDA	585,369	584,174
ROA	0.30%	0.28%
EBITDA/Sales	28.04%	27.98%
Net Earnings per Hog	$1.11	$1.02

Hog pool price/ckg	$140.00	$140.00
		($0.09)

ENTERPRISE RETURNS MODULE

Project 01-05

Revenues:	500 ml/min, standard height	1000 ml/min, low height	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	11,662	$0.08
			$0.00
Total Revenues	**2,087,552**	**2,088,700**	$0.08
Capital Asset Values:	500 ml/min, standard height	1000 ml/min, low height	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,009,338**	**5,009,338**	$0.00
Size of Operations (Sows)	500 ml/min, standard height	1000 ml/min, low height	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	359,902	$0.00
Total Feed	794,343	794,343	$0.00
	500 ml/min, standard height	1000 ml/min, low height	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	**404,575**	**404,575**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,226	34,635	-$0.25
Water Consumption	17,445	19,528	-$0.15
Water and Manure Handling:	**48,671**	**54,164**	-$0.40
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	**718,235**	**718,235**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	500 ml/min, standard height	1000 ml/min, low height
Operating Interest	23,598	23,696
Total Operating	1,354,069	1,359,660
Total Costs	2,072,304	2,077,895
	5 Year Average Feed Cost	
Gross Margin	733,483	729,040
Net Earnings	15,248	10,805
EBITDA	585,369	580,927
ROA	0.30%	0.22%
EBITDA/Sales	28.04%	27.81%
Net Earnings per Hog	$1.11	$0.79

Hog pool price/ckg	$140.00	$140.00
		[illegible]

ENTERPRISE RETURNS MODULE

Project 01-05

Revenues:	500 ml/min, standard height	1000 ml/min, low height	Difference
Market Hogs	2,027,044	2,027,044	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,514	11,662	$0.08
			$0.00
Total Revenues	2,087,552	2,088,700	$0.08

Capital Asset Values:	500 ml/min, standard height	1000 ml/min, low height	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	815,826	815,826	$0.00
Grower Facilities	909,985	909,985	$0.00
Finisher Facilities	1,258,842	1,258,842	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,009,338	5,009,338	$0.00

Size of Operations (Sows)	500 ml/min, standard height	1000 ml/min, low height	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	133,783	133,783	$0.00
Grower Diets	169,719	169,719	$0.00
Finisher Diets	359,902	359,902	$0.00
Total Feed	794,343	794,343	$0.00

	500 ml/min, standard height	1000 ml/min, low height	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,232	34,232	$0.00
Maintenenace & Repairs	49,568	49,568	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,423	3,423	$0.00
Marketing & Transportation	68,464	68,464	$0.00
AI Supplies	6,162	6,162	$0.00
Barn Supplies	20,539	20,539	$0.00
Management and Consulting Fees	21,635	21,635	$0.00
Other Misc Costs	685	685	$0.00
Total Misc & Supplies	404,575	404,575	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,226	34,635	-$0.25
Water Consumption	17,445	19,528	-$0.15
Water and Manure Handling:	48,671	54,164	-$0.40

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,941	93,941	$0.00
Interest and Deprec: Grower	104,588	104,588	$0.00
Interest and Deprec: Finisher	144,891	144,891	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,390	53,390	$0.00
Property tax	15,747	15,747	$0.00
Total Fixed Costs	718,235	718,235	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	500 ml/min, standard height	1000 ml/min, low height
Operating Interest	23,598	23,696
Total Operating	1,354,069	1,359,660
Total Costs	2,072,304	2,077,895
	5 Year Average Feed Cost	
Gross Margin	733,483	729,040
Net Earnings	15,248	10,805
EBITDA	585,369	580,927
ROA	0.30%	0.22%
EBITDA/Sales	28.04%	27.81%
Net Earnings per Hog	$1.11	$0.79

Hog pool price/ckg	$140.00	$140.00
		($0.32)

Nutritional Value of High-Oil Oat Groats

Ruurd T. Zijlstra *Ph.D.*, Brian G. Rossnagel[1] *Ph.D.*, Dave D. Maenz[2,3] *Ph.D.*, John F. Patience *Ph.D.*, and Vern J. Racz[1] *M.Sc.*

Summary

High-oil germplasm should increase the DE content of feed ingredients. The nutritional value of high oil oat groats was analyzed using grower and weaned pigs. Using grower pigs, DE content of high oil oat groats was 5% higher than regular oat groats. A subsequent performance trial with weaned pigs indicated that high oil oat groats resulted in a similar performance as regular oat groats if replaced on an equal weight basis.

High oil groats can be a worthwhile alternative for weaned pigs.

Introduction

High oil is a natural variant in oats, similar to high oil corn (*2000 Annual Research Report*). Subsequent dehulling produces high oil oat groats that should have a nutritional value superior to regular oat groats, because of an assumed higher DE content. Regular oat groats are recognized for their palatability and high energy density. The nutritional value of high oil oat groats has not been explored extensively.

Experimental Procedures

High oil and regular oat groats were analyzed by proximate analyses. Diets consisting of 96% high-oil oats or oat groats, plus vitamins, minerals, and chromic oxide as an indigestible marker were fed to grower pigs. Mash diets based on corn, wheat, or regular oat groats (50 or 100% replacement of wheat) were formulated to an equal nutritional value (phase-1, 3,540 kcal DE/kg, 1.4% total lysine; phase-2, 3,430 kcal DE/kg, 1.24% total lysine) and then fed to three-week-old weaned pigs for four weeks (2 wk phase-1, 2 wk phase-2). High oil oat groats replaced regular oat groats on a weight basis to create a total of six dietary treatments.

Results and Discussion

The fat content was higher for high oil oat groats than regular oat groats (10.1 vs. 7.2 % DM); however, protein content was lower (11.3 vs. 12.1% DM). The DE content (DM) was 2,920 kcal/kg for high oil whole oats, 4,341 kcal/kg for high oil oat groats, and 4,149 for regular oat groats (Figure 1). This indicates that the DE content of high oil oat groats is 5% higher than regular oat groats. The DE content of high oil whole oats remained low. Average daily gain was higher for 100% oat groats than wheat diets fed to weaned pigs ($P < 0.05$; Figure 2), indicating that oat groats are a palatable ingredient with a high nutrient density for weaned pigs. Overall, performance of pigs fed high oil oat groat was similar to pigs fed regular oat groats (Figure 2), indicating that the increase in energy intake did not result in improved performance, perhaps due to the lower than expected protein content of the high-oil oat groats.

Implications

The fat content of high-oil oat groats was higher than regular oat groats, and did result in a 5% higher DE content. High oil oat groats did not have any adverse effects on performance and seems a worthwhile product to pursue to increase energy intake of young pigs.

Acknowledgements

Strategic program funding provided by Sask Pork, Alberta Pork, Manitoba Pork, and Saskatchewan Agriculture and Food Development Fund. Project funding was provided by the College of Agriculture/SWP First and Best Campaign Fund.

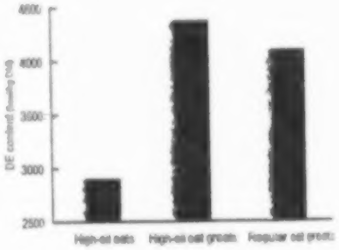

Figure 1. **The DE content of high-oil whole oats, high-oil oat groats, and regular oat groats as analysed in grower pigs. High-oil oats groats was derived from the high-oil whole oat samples.**

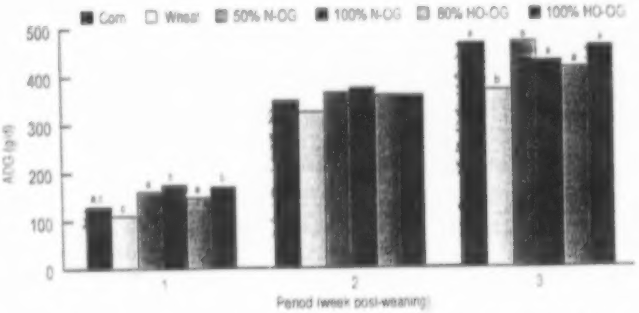

Figure 2. **Average daily gain over the first 3 weeks for 3-week-old weaned pigs fed diets including corn, wheat, or 50 or 100% of the wheat replaced with normal (N) or high-oil (HO) oat groats (OG; $P < 0.05$).**

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[1] Crop Development Centre, University of Saskatchewan

[2] Prairie Feed Resource Centre Inc., University of Saskatchewan

[3] currently MCN Canola Products Inc.

ENTERPRISE RETURNS MODULE

Revenues	Wheat	50% Normal Oats	Difference
Market Hogs	2,063,899	2,095,243	$2.25
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,155,898	$2.25
Capital Asset Values	Wheat	50% Normal Oats	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00
Size of Operations (Sows)	Wheat	50% Normal Oats	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	210,292	-$0.82
Grower Diets	170,889	174,309	-$0.25
Finisher Diets	317,931	324,294	-$0.46
Total Feed	818,620	839,835	-$1.52
	58.72		
	Wheat	50% Normal Oats	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	722,003	722,003	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wheat	50% Normal Oats
Operating Interest	24,107	24,483
Total Operating	1,383,254	1,404,845
Total Costs	2,105,257	2,126,848
		5 Year Average Feed Cost
Gross Margin	741,299	751,053
Net Earnings	19,296	29,049
EBITDA	592,863	602,617
ROA	0.38%	0.58%
EBITDA/Sales	27.91%	27.95%
Net Earnings per Hog	$1.38	$2.08

Hog pool price/ckg	$140.00	$140.00
Difference		$0.70

ENTERPRISE RETURNS MODULE

Project 01-06

Revenues:	Wheat	50% Normal Oats	Difference
Market Hogs	2,063,899	2,095,243	$2.25
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,155,898**	$2.25
Capital Asset Values:	Wheat	50% Normal Oats	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,030,069**	**5,030,069**	$0.00
Size of Operations (Sows)	Wheat	50% Normal Oats	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	210,292	-$0.82
Grower Diets	170,889	174,309	-$0.25
Finisher Diets	317,931	324,294	-$0.46
Total Feed	818,620	839,835	-$1.52
	58.72		
	Wheat	50% Normal Oats	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**722,003**	**722,003**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Wheat	50% Normal Oats
Operating Interest	24,107	24,483
Total Operating	1,383,254	1,404,845
Total Costs	2,105,257	2,126,848
	5 Year Average Feed Cost	
Gross Margin	741,299	751,053
Net Earnings	19,296	29,049
EBITDA	592,863	602,617
ROA	0.38%	0.58%
EBITDA/Sales	27.91%	27.95%
Net Earnings per Hog	$1.38	$2.08

Hog pool price/ckg	$140.00	$140.00

Difference $0.70

Replacement of Soybean Meal with Canola Meal in Weaned Pig Diets

E. David Ekpe *Ph.D.*, Ruurd T. Zijlstra *Ph.D.*, John F. Patience *Ph.D.*, Hank L. Classen[1] *Ph.D.*, and P. Howard Simmins[2] *Ph.D.*

Summary

Fibre content is three times higher in canola meal than soybean meal, and may limit nutrient availability. The present study determined whether canola meal could replace soybean meal in weaned pig diets with a balanced digestible nutrient content. Increasing content of canola meal increased fibre content in diets, and decreased voluntary feed intake, ADG and feed efficiency. Performance correlated negatively with fibre content in diets, and was reduced when canola meal replaced 75% or more soybean meal.

Canola's meal's high fibre content hinders performance in weaned pigs.

Introduction

The lower nutritional value of canola meal compared to soybean meal may be related to high fibre content. Fibre limits digestibility and availability of nutrients, and negatively affects use of canola meal in the pork industry. An accurate assessment of nutritional value may lead to better use of canola meal and reduced nutrient wastes to environment.

Experimental Procedures

Diets with 0, 4, 8, 12, or 16% canola meal were fed to five-week-old weaned pigs for three weeks to determine effects on performance. Canola meal replaced 0, 25, 50, 75, or 100% soybean meal on an equal weight basis. Diets were formulated to equal DE (Figure 1) and 3.15 g digestible lysine/Mcal DE. Differences in digestible nutrient content were compensated for with purified energy and amino acid ingredients. feces were collected to measure actual DE content. Fibre and glucosinolate contents in feed were determined. Regression analysis determined relationships between fibre content in feed and pig performance.

Results and Discussion

Diets ranged from 4.3 to 6.3% in ADF and 11.5 to 15.2% in NDF from low to high canola meal diets. Dietary glucosinolates were below detection limits, but ~0.2 mmoles/g of 3-butenyl or 2-OH-butenyl glucosinolates were measured in 12 and 16%-canola meal diets. The measured DE content of diets differed ($P < 0.05$), and was highest for the 16% canola meal diet. From low to high canola meal diets, voluntary feed intake reduced from 0.92 to 0.81 kg/d, ADG reduced from 0.56 to 0.46 kg/d (Figure 2), and feed efficiency reduced from 60 to 57%. For each per cent increase in canola meal in diet, ADFI, ADG, and feed efficiency decreased by 6.2 g/d, 5.5 g/d, and 2.5, respectively, even though DE was compensated for by addition of canola oil. Performance correlated negatively with fibre content in diets. Reduction in performance may be related to fibre but not glucosinolate content of canola meal.

Implications

Inclusion of canola meal increased fibre content of the diet and reduced performance of weaned pigs. Inclusion of more than 8% canola meal in weaned pig diets may not be economically beneficial to the pork industry, without additional processing to reduce negative effects of fibre content.

Acknowledgements

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork, and Saskatchewan Agriculture and Food Development Fund. Project funding was provided by Finnfeeds International Ltd., Canola Council of Canada, and National Sciences and Engineering Research Council of Canada.

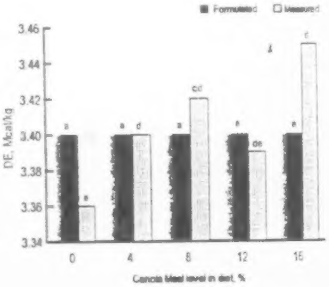

Figure 1 **Formulated and measured DE content of diets fed to weaned pigs (P < 0.05).**

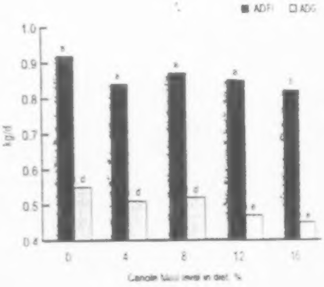

Figure 2 Relationship between canola meal level in diets and performance of weaned pigs (P < 0.05).

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[1] Department of Animal & Poultry Science, University of Saskatchewan, Saskatoon

[2] Finnfeeds International Ltd., Marlborough Wiltshire, United Kingdom

ENTERPRISE RETURNS MODULE

Project 01-07

Revenues:	Soybean Meal	4% Canola Meal	Difference
Market Hogs	2,063,899	2,050.895	-$0.93
Weaners/weanlings			$0.00
Cull Sows	49.575	49.575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10.660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,111,549	-$0.93
Capital Asset Values:	Soybean Meal	4% Canola Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Soybean Meal	4% Canola Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,897	193,472	$0.39
Grower Diets	170,889	169,607	$0.09
Finisher Diets	306,776	304,475	$0.17
Total Feed	807,501	798,494	$0.65
	57.92		
	Soybean Meal	4% Canola Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Soybean Meal	4% Canola Meal
Operating Interest	23,910	23,750
Total Operating	1,371,938	1,362,771
Total Costs	2,092,454	2,083,287
	5 Year Average Feed Cost	
Gross Margin	752,616	748,779
Net Earnings	32,099	28,262
EBITDA	604,298	600,461
ROA	0.64%	0.56%
EBITDA/Sales	28.44%	28.44%
Net Earnings per Hog	$2.30	$2.02

Hog pool price/ckg	$140.00	$140.00
	Difference	($4.275)

ENTERPRISE RETURNS MODULE

Project 01-07

Revenues:	Soybean Meal	8% Canola Meal	Difference
Market Hogs	2,063,899	2,044,642	-$1.38
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,105,297**	-$1.38

Capital Asset Values:	Soybean Meal	8% Canola Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Soybean Meal	8% Canola Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,897	188,166	$0.77
Grower Diets	170,889	169,522	$0.10
Finisher Diets	306,776	304,322	$0.18
Total Feed	807,501	792,949	$1.04
	57.92		

	Soybean Meal	8% Canola Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Soybean Meal	8% Canola Meal
Operating Interest	23,910	23,652
Total Operating	1,371,938	1,357,128
Total Costs	2,092,454	2,077,644
	5 Year Average Feed Cost	
Gross Margin	752,616	748,169
Net Earnings	32,099	27,652
EBITDA	604,298	599,852
ROA	0.64%	0.55%
EBITDA/Sales	28.44%	28.49%
Net Earnings per Hog	$2.30	$1.98

Hog pool price/ckg	$140.00	$140.00

Difference ($0.32)

ENTERPRISE RETURNS MODULE

Project 01-07

Revenues:	Soybean Meal	4% Canola Meal	Difference
Market Hogs	2,063,899	2,050,893	-$0.93
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,111,549**	-$0.93

Capital Asset Values:	Soybean Meal	4% Canola Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Soybean Meal	4% Canola Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,897	193,472	$0.39
Grower Diets	170,889	169,607	$0.09
Finisher Diets	306,776	304,475	$0.17
Total Feed	807,501	798,494	$0.65
	57.92		

	Soybean Meal	4% Canola Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Soybean Meal	4% Canola Meal
Operating Interest	23,910	23,750
Total Operating	1,371,938	1,362,771
Total Costs	2,092,454	2,083,287
	5 Year Average Feed Cost	
Gross Margin	752,616	748,779
Net Earning	32,099	28,262
EBITDA	604,298	600,461
ROA	0.64%	0.56%
EBITDA/Sales	28.44%	28.44%
Net Earnings per Hog	$2.30	$2.02

Hog pool price/ckg	$140.00	$140.00

Difference [illegible]

ENTERPRISE RETURNS MODULE

Project 01-07

Revenues:	Soybean Meal	8% Canola Meal	Difference
Market Hogs	2,063,899	2,044,642	-$1.38
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,105,297	-$1.38
Capital Asset Values:	Soybean Meal	8% Canola Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Soybean Meal	8% Canola Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,897	188,166	$0.77
Grower Diets	170,889	169,522	$0.10
Finisher Diets	306,776	304,322	$0.18
Total Feed	807,501	792,949	$1.04
	57.92		
	Soybean Meal	8% Canola Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	182,883	182,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Soybean Meal	8% Canola Meal
Operating Interest	23,910	23,652
Total Operating	1,371,938	1,357,128
Total Costs	2,092,454	2,077,644
	5 Year Average Feed Cost	
Gross Margin	752,616	748,169
Net Earnings	32,099	27,652
EBITDA	604,298	599,852
ROA	0.64%	0.55%
EBITDA/Sales	28.44%	28.49%
Net Earnings per Hog	$2.31	$1.99

Hog post price/ckg	$140.00	$140.00
	Difference	($0.32)

EFFECT OF FEED PRESENTATION ON THE FEEDING BEHAVIOUR OF GROWER/FINISHER PIGS

Kimberly A.M. MacDonald, and Harold W. Gonyou

Introduction

Recent research suggests the once standard five pigs per feeder space underestimates the actual carrying capacity of most modern feeder designs. The maximum number of pigs that can be fed from a single feeder space should be highly correlated with the eating speed of the animals. The feeding behaviour of pigs is influenced by many factors such as, but not limited to, competition, feed type (pellet vs. mash), presentation (dry vs. wet/dry or liquid feeding systems) and pig size. In this study, we examined the effect of feed type and presentation on the eating behaviour of grower/finisher pigs. Furthermore, we attempted to determine if these effects would then translate into higher stocking densities of the feeder (based on percentage of capacity of the feeder).

Methods

Experiment One. Pigs were randomly assigned to each of four treatments: dry mash (DM), wet/dry mash (WM), dry pellets (DP) and wet/dry pellets (WP), fed from a single space feeder. Each pen contained six barrows and six gilts, and the average weight in each pen was similar. Feed was weighed as it was added to the feeder; pigs and any remaining feed were weighed every two weeks. When the pigs were small (35-45 kg), the pens were videotaped for two consecutive 24-hour periods in order to determine total duration of eating. Video recordings and analysis were repeated when the pigs were large (90-100kg) to determine the effects of size on time spent eating and if this effect was consistent across the treatments.

Experiment Two. Using data from experiment one, an estimate of the number of pigs required to create various levels of feeder space utilization (stocking density) under each previously outlined feeding condition was calculated. Grower pig numbers were based on small data, while finisher phase numbers were calculated using large pig data. Stocking densities examined were standard (12 pigs/pen), 95, 110 and 125% of feeder capacity in the grower phase and 80, 102.5 and 125% of capacity in the finisher phase. Pigs stayed in the grower phase for six weeks before being randomly reassigned to the finisher phase treatments, where they stayed for four weeks. Video recordings were taken when the pigs were 35-45kg in grower and during the third week of finisher. Feed was weighed as it was added to the feeders, and pigs were weighed regularly.

Results

Experiment One. Pigs fed a DM diet spent significantly more time at the feeder than those fed WM, DP or WP (refer to table 1). There was no significant difference in total duration of eating among WM, DP and WP fed pigs. ADFI was similar among treatment groups. However, ADG was lower in DM fed pigs as compared to WM or WP treatments. DP pigs had intermediate gains (see table 1). Large pigs spent less time at the feeder than small pigs.

Pigs on a dry mash diet spent more time at the feeder than those on other diets.

Experiment Two. Comparisons between groups of similar size (12 pigs in grower and 18 pigs in finisher) revealed results similar to those found in experiment one. In the grower phase, DM pigs spent more time at the feeder than DP, WM and WP fed pigs (98.3 vs. 87.6 vs. 61.2 vs. 80.0 min/pig/day). Also, DM pigs gained less than WM, DP or WP fed pigs (748 vs. 833 vs. 799 vs. 792 g/day). Pigs fed a WM diet had higher ADFI, while no significant differences were found in ADFI among DM, DP and WP fed pigs (2.15 vs. 1.91 vs. 1.86 vs. 1.88 kg/pig/day). Similar trends were apparent in the finisher phase (see Table 2).

As stocking density increased, time spent eating per pig decreased in both grower and finisher phases, regardless of feed type or presentation. Likewise, ADG and ADFI had a tendency to decrease as stocking density increased, particularly in treatments that exceeded 100% of capacity. However, the point at which production values significantly decreased varied based on feed type and presentation.

Conclusions

Feed type (mash vs. pellets) and presentation (dry vs. wet/dry) have major affects on swine eating behaviour and, in turn, can influence productivity. Pigs fed dry mash diets spend more time eating, however this effect can be counteracted by the addition of water, such as in a wet/dry feeding system. This same effect does not appear to apply to wet/dry versus dry pellets, which could be due to a variety of factors, such as palatability or simple mechanics. These results are noticeable in both grower and finisher phases, suggesting that the disadvantages and advantages associated with feed type and presentation are persistent, even with the increased eating speed of larger animals.

Stocking density (based on percentage of capacity) of the feeder also has a strong influence on time spent eating per pig, ADFI and ADG. As stocking density increased there was a general trend for ADG and ADFI to fall, regardless of feed type and presentation (see figure 1 for an example). In the grower phase, the maximum number of pigs that could be fed from a single feeder space without a significant decrease in ADG and ADFI was 15, 19, 20 and 21 for DM, WM, WP and DP feed respectively. While in the finisher phase, 14, 18 and 23 pigs could be fed DM, WM and DP respectively, from a single feeder space. There was no intermediate group size for WP fed pigs in the finisher phase, but at least 18 pigs can be fed from a single feeder space and maintain good ADG and ADFI.

Maximum stocking density depends on feed type and presentation.

Acknowledgments

Strategic program funding provided by Sask Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund. Additional funding for this research was made available by the Alberta Agriculture Research Institute and the Alberta Pork Producer Council.

Table 1. Overall effect of feed type and presentation on ADG, ADFI and Total Duration of Eating, (Experiment One)

Feed Type	Presentation	ADG (kg)	SEM	ADFI (kg)	SEM	Total Duration of Eating (min/pig/day)	SEM
Mash	Dry	0.792^{a}	0.023	2.50	0.145	106.10^{a}	2.91
Mash	Wet/Dry	0.903^{b}	0.026	2.38	0.145	68.04^{b}	2.91
Pellet	Dry	0.868^{b}	0.021	2.48	0.145	58.79^{b}	2.91
Pellet	Wet/Dry	0.899^{b}	0.025	2.37	0.205	59.70^{b}	2.91

^{ab} ; p <0.05

Table 2. Overall effect of feed type and presentation on ADG, ADFI and Total Duration of Eating - Finisher Phase (Group size = 18 pigs) (Experiment Two)

Feed Type	Presentation	ADG (kg)	SEM	ADFI (kg)	SEM	Total Duration of Eating (min/pig/day)	SEM
Mash	Dry	0.739^{b}	0.046	2.31^{b}	0.139	78.6^{a}	12.35
Mash	Wet/Dry	0.955^{a}	0.046	2.93^{a}	0.139	69.7^{b}	12.35
Pellet	Dry	0.867^{a}	0.045	2.51^{a,b}	0.139	68.9^{b}	12.35
Pellet	Wet/Dry	1.02^{a}	0.044	2.71^{a,b}	0.139	65.5^{b}	12.35

Numbers with different superscripts have $p<0.05$

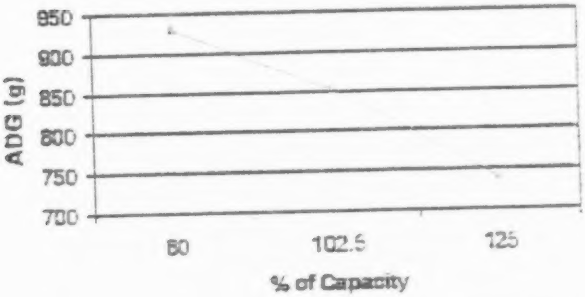

Figure 1. Effect of stocking density on ADG of DM fed pigs in the Finisher Phase

ENTERPRISE RETURNS MODULE

00-01

Revenues:	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder	Difference
Market Hogs	2,063,899	1,989,501	-$5.34
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,050,155**	-$5.34

Capital Asset Values:	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,030,069**	**5,030,069**	$0.00

Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	279,779	$2.74
Total Feed	818,620	780,468	$2.74
	58.72		

	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**722,003**	**722,003**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder
Operating Interest	24,107	23,430
Total Operating	1,383,254	1,344,426
Total Costs	2,105,257	2,066,429
	5 Year Average Feed Cost	
Gross Margin	741,299	705,730
Net Earnings	19,296	(16,274)
EBITDA	592,863	557,294
ROA	0.38%	-0.32%
EBITDA/Sales	27.91%	27.18%
Net Earnings per Hog	$1.38	($1.17)

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.55)

ENTERPRISE RETURNS MODULE

00-01

Revenues:	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder	Difference
Market Hogs	2,063,899	2,043,186	-$1.49
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,103,841	-$1.49

Capital Asset Values:	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	

Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder	
	5 Year Average Feed Cost		
Feed: Average Feed Costs			
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	305,214	$0.91
Total Feed	818,620	805,903	$0.91
	58.72		

Misc. Costs:	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder	
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Vetennary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	722,003	722,003	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder
Operating Interest	24,107	23,881
Total Operating	1,383,254	1,370,311
Total Costs	2,105,257	2,092,315
	5 Year Average Feed Cost	
Gross Margin	741,299	733,529
Net Earnings	19,296	11,526
EBITDA	592,863	585,093
ROA	0.38%	0.23%
EBITDA/Sales	27.91%	27.81%
Net Earnings per hog	$1.38	$0.83

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.56

ENTERPRISE RETURNS MODULE

00-01

Revenues	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder	Difference
Market Hogs	2,063,899	1,989,501	-$5.34
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,050,155	-$5.34

Capital Asset Values:	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00

Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	279,779	$2.74
Total Feed	818,620	780,468	$2.74
	58.72		

	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	722,003	722,003	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Mash, Dry Feeder
Operating Interest	24,107	23,430
Total Operating	1,383,254	1,344,426
Total Costs	2,105,257	2,066,429
	5 Year Average Feed Cost	
Gross Margin	741,299	705,730
Net Earnings	19,296	(16,274)
EBITDA	592,863	557,294
ROA	0.38%	-0.32%
EBITDA/Sales	27.91%	27.18%
Net Earnings per Hog	$1.38	[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference ($2.55)

ENTERPRISE RETURNS MODULE

00-01

Revenues	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder	Difference
Market Hogs	2,063,899	2,043,186	-$1.49
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,103,841	-$1.49

Capital Asset Values	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,030,069	$0.00

Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	305,214	$0.91
Total Feed	818,620	805,903	$0.91
	58.72		

Misc. Costs	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder	
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	722,003	722,003	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Pellets, Dry Feeder
Operating Interest	24,107	23,881
Total Operating	1,383,254	1,370,311
Total Costs	2,105,257	2,092,315
	5 Year Average Feed Cost	
Gross Margin	741,299	733,529
Net Earnings	19,296	11,526
EBITDA	592,863	585,093
ROA	0.38%	0.23%
EBITDA/Sales	27.91%	27.81%
Net Earnings per hog	$1.38	$0.82

Hog pool price/ckg	$140.00	$140.00

Difference -$0.56

ENTERPRISE RETURNS MODULE

00-01

Revenues:	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder	Difference
Market Hogs	2,063,899	2,060,987	-$0.21
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,121,642**	-$0.21

Capital Asset Values:	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nursery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,030,069**	**5,030,069**	$0.00

Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	316,523	$0.10
Total Feed	818,620	817,212	$0.10
	58.72		

	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**722,003**	**722,003**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder
Operating Interest	24,107	24,082
Total Operating	1,383,254	1,381,821
Total Costs	2,105,257	2,103,824
	5 Year Average Feed Cost	
Gross Margin	741,299	739,821
Net Earnings	15,296	17,817
EBITDA	592,863	591,385
ROA	0.38%	0.35%
EBITDA/Sales	27.91%	27.87%
Net Earnings per Hog	$1.3	$1.2

Hog pool price/ckg	$140.00	$140.00

Difference ($0.11

ENTERPRISE RETURNS MODULE

Revenues:	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder	Difference
Market Hogs	2,063,899	2,060,987	-$0.21
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,121,642**	-$0.21

Capital Asset Values:	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,265,993	1,265,993	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,030,069**	**5,030,069**	$0.00

Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	316,523	$0.10
Total Feed	818,620	817,212	$0.10
	58.72		

	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,847**	**49,847**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	145,917	145,917	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,713	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**722,003**	**722,003**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Mash Diet, Wet/Dry Feeder	Pellets, Wet/Dry Feeder
Operating Interest	24,107	24,082
Total Operating	1,383,254	1,381,821
Total Costs	2,105,257	2,103,824
	5 Year Average Feed Cost	
Gross Margin	741,299	739,821
Net Earnings	19,296	17,817
EBITDA	592,863	591,385
ROA	0.38%	0.35%
EBITDA/Sales	27.91%	27.87%
Net Earnings per Hog	$1.38	$1.28

Hog pool price/ckg	$140.00	$140.00
Difference		($0.11)

PERFORMANCE AND CARCASS QUALITY OF GROWING-FINISHING PIGS SUBMITTED TO REDUCED NOCTURNAL TEMPERATURE

Stephane P. Lemay, Huiqing Guo [1],
Ernest M. Barber [2]

Reduced temperature set point would yield a net return of 80c per pig during summer time.

Background

During summer months, elevated barn temperature reduces pig growth rate by decreasing feed intake. This negative impact on pig performance lengthens the growth period and reduces the productivity level of a swine barn. On the Canadian Prairies, summer days can be very hot but nights are generally cool. Based on previous experiment results, it was suggested that a reduced temperature setpoint during the summer could sustain pig performance by perhaps modifying pig eating behavior and stimulating the average daily feed intake.

The trials

Two trials, a pilot study and a large scale experiment, were conducted over two summers to evaluate the impact of a reduced nocturnal temperature strategy on the performance and carcass quality of growing-finishing pigs over summer months. Typical rooms had a temperature setpoint that is generally used in commercial barns while the temperature setpoint for reduced nocturnal temperature (RNT) rooms was lowered by 6°C.

The results

In Saskatchewan, a reduced temperature setpoint resulted in a lower nocturnal room temperature (1.6°C cooler at night over eight weeks). No influence on room daytime temperature could be measured. The average daily temperature fluctuation in RNT rooms was increased by 2.1°C. The temperature pattern in typical and RNT rooms for three days of experiment is presented on Fig. 1. The lower nocturnal temperature also resulted in a higher relative humidity (+3 per cent) and lower carbon dioxide and ammonia concentrations.

During trial 1, pig average daily gain (ADG) in the RNT room was increased by 5.2 per cent as showed in Table I. For trial 2, feed intake was 3.2 per cent higher in RNT rooms which increased ADG by 2.1 per cent in average over eight weeks as presented in table II. The ADG increase averaged 3.6 per cent during the last four weeks of trial 2. However, pig performance was not statistically increased by the RNT (P>0.05). No statistical difference was found in terms of feed conversion and back fat thickness (P>0.05).

The benefits

The results suggest that even without statistical significance, the reduced temperature setpoint strategy would provide a net return of 0.80 CAN$/pig sold for pigs raised over the summer period in Saskatchewan. Both trials showed that healthy growing-finishing pigs are not negatively affected by a large daily temperature fluctuation (up to 13°C) as long as this fluctuation is progressively achieved through the day-night outside temperature fluctuation. Based on this research, it is also suggested that summer temperature setpoints for growing-finishing pigs should not be increased to reduce daily temperature fluctuations.

Acknowledgments

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Table I Pig performance and carcass quality for the pilot study (July 11th to September 4th, 1997)

Sex	ADG* (kg/day)		TFI* (kg)		FC* (kg/kg)		Carcass lean (RT Ultra sound, %)	
	Typical	RNT	Typical	RNT	Typical	RNT	Typical	RNT
Male	0.905	0.953	10330	10753	2.950	2.981	40.1	39.2
Female	0.855	0.898	9059	9714	2.834	2.771	40.7	40.5
Average	0.880	0.926	9695	10234	2.892	2.876	40.4	39.9

***ADG: average daily gain, TFI: total feed intake, FC: feed conversion, RT Ultra sound: real time ultra sound.**

Table II Pig performance and carcass quality from the large scale experiment (July 24th to September 17th, 1998)

Sex	ADG (kg/day)		ADFI* (kg/day)		FC (kg/kg)		BF Thickness* (mm)	
	Typical	RNT	Typical	RNT	Typical	RNT	Typical	RNT
Male	0.874	0.900	2.301	2.366	2.692	2.682	11.4	11.7
Female	0.833	0.844	2.136	2.212	2.628	2.668	10.5	11.2
Average	0.854	0.872	2.219	2.289	2.660	2.675	11.0a	11.5a

***ADFI: average daily feed intake, BF thickness: back fat thickness.**
†Males were statistically different than females (P<0.05)
Averages followed by the same letter on a same row are not statistically different (P>0.05).

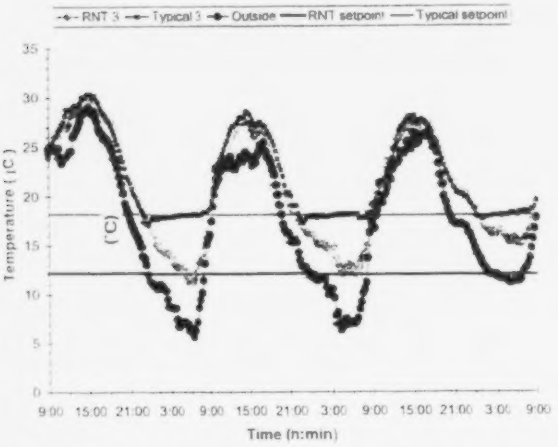


Figure 1 Temperature pattern in typical and RNT rooms from September 4th to 7th, 1998.

ENTERPRISE RETURNS MODULE

Project 99-01

Revenues:	Typical G-F	Reduced Nocturnal Temperature	Difference
Market Hogs	2,063,899	2,092,637	$2.06
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,153,291	$2.06

Capital Asset Values:	Typical G-F	Reduced Nocturnal Temperature	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Typical G-F	Reduced Nocturnal Temperature	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	320,842	-$1.01
Total Feed	807,465	821,531	-$1.01
	57.92		

Misc. Costs:	Typical G-F	Reduced Nocturnal Temperature	
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Typical G-F	Reduced Nocturnal Temperature
Operating Interest	23,909	24,159
Total Operating	1,371,902	1,386,217
Total Costs	2,092,418	2,106,733
	5 Year Average Feed Cost	
Gross Margin	752,652	767,074
Net Earnings	32,136	46,558
EBITDA	604,335	618,757
ROA	0.64%	0.93%
EBITDA/Sales	28.45%	28.74%
Net Earnings per Hog	$2.30	$3.34

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.03

ENTERPRISE RETURNS MODULE

Project 99-01

Revenues	Typical G-F	Reduced Nocturnal Temperature	Difference
Market Hogs	2,063,899	2,092,637	$2.06
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,153,291	$2.06

Capital Asset Values	Typical G-F	Reduced Nocturnal Temperature	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Typical G-F	Reduced Nocturnal Temperature	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	320,842	-$1.01
Total Feed	807,465	821,531	-$1.01
	57.92		

	Typical G-F	Reduced Nocturnal Temperature	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Typical G-F	Reduced Nocturnal Temperature
Operating Interest	23,909	24,159
Total Operating	1,371,902	1,386,217
Total Costs	2,092,418	2,106,733
	5 Year Average Feed Cost	
Gross Margin	752,652	767,074
Net Earnings	32,136	46,558
EBITDA	604,335	618,757
ROA	0.64%	0.93%
EBITDA/Sales	28.45%	28.74%
Net Earnings per Hog	$2.31	$3.34

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.03

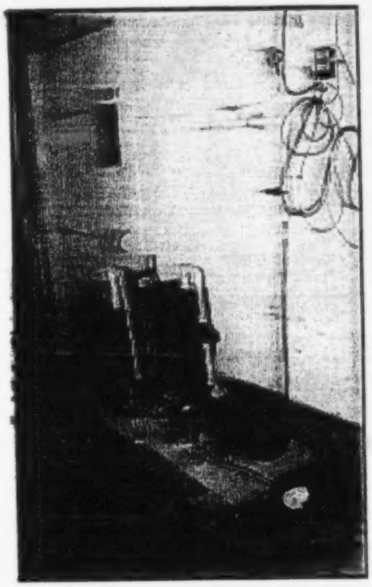
AN OIL SPRINKLING SYSTEM FOR DUST CONTROL IN PIG BUILDINGS

Stephane P. Lemay, Ernest M. Barber [1],
Myles Bantle [2], Dominic Marcotte

Background

Swine producers are exposed to high dust levels in pig barns, and different dust control methods have been tested over the last decade. Until now, oil sprinkling seemed to be the most promising technique providing dust reduction from 50 to 80 per cent. In previous experiments, the oil was manually applied once or twice a day.

The swine industry has not easily adopted oil application technology because of the very intensive labour needed for manual oil sprinkling. Therefore, the next logical step was to develop and build a low cost automatic system able to provide recommended oil application rates for dust control. The system had to operate at a low pressure with pure canola oil, considering that a high pressure system can produce an oil mist that would likely be a greater risk for workers than the dust itself.



Oil sprinkling system. This semi-portable prototype designed and built at Praire Swine Centre consists of pump, reservoir, pressure gauges and control valves. Initial testing with the unit showed a 79 per cent reduction in dust mass concentration.

Nozzle selection

Six different types of agricultural nozzles were tested in a laboratory experiment to identify a suitable nozzle for the system. Nozzle flow rate and application patterns were measured under controlled temperature and pressure conditions. Based on those measurements, the most suitable nozzle was selected for the oil sprinkling system.

The system

The system tested in the barn consisted of an hydraulic pump, an oil reservoir, two pressure gauges and two control valves modulating the oil flow rate between the main line heading to the nozzles and a recirculation loop which brings the oil overflow back to the reservoir. All components were mounted on a cart and a flexible hose was used to connect to the room pipeline.

The oil pipeline was installed in a rectangular grower-finisher room (14.4 m x 5.4 m x 2.9 m high, 6 pens of 12 pigs). The pipeline, which included nine nozzles in total, was suspended 0.3 m below the ceiling and in line with the front of the pens. Six nozzles, one in front of each pen, were directed to distribute oil within the pens, and three nozzles were oriented to sprinkle oil on the floor of the operator walkway.

Dust reduction

The oil sprinkling system was tested over a two week period in January 1999. The dust concentration of two rooms (one without oil and the one provided with the system) was measured over the experimental period. Each room housed 68 pigs of 89 kg in average. Oil application was done using recommended rates for dust control (40 ml of oil/m^2-day for the two first days, 20 ml of oil/m^2-day for the next two days, and 5 ml of oil/m^2-day for the next ten days).

The sprinkling system provided a dust mass concentration reduction of 79 per cent compared with the control room over the two week period as shown in Fig. 1. Respirable (0.5 to 5.0 um) and inhalable (>0.5 um) dust particle counts were reduced by 73 and 80 per cent respectively as indicated in Fig. 2 and Table 1. The system was effective in replicating previous dust reduction data obtained with manual equipment and can be used to control dust levels in swine buildings with undiluted canola oil.

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[1] Dean, College of Agriculture, University of Saskatchewan
[2] Bantle Engineering Research, Saskatoon

Cost of application and future research

Considering that the same system (cart) would be used for 10 grower-finisher rooms, the cost of oil application would be less than a $1.00 per pig sold. Future projects will look at optimising oil usage (application rate and walkway sprinkling) and at long term effects of oil sprinkling.

Acknowledgements

Strategic funding was provided by SaskPork, Alberta Pork, Manitoba Pork, and Saskatchewan Agriculture and Food Development Fund. The authors also thank Mr. Robert Fengler, Research Technician–Engineering at PSCI, for his technical assistance during the project.

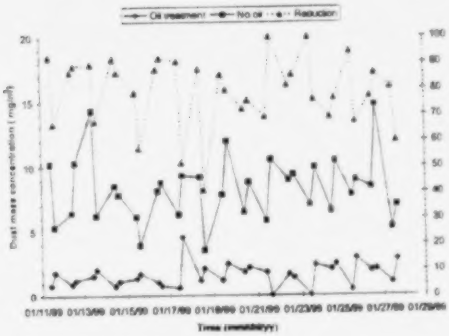

Figure 1 Dust mass concentration in both control and oil sprinkled rooms from January 11th to 27th, 1999.

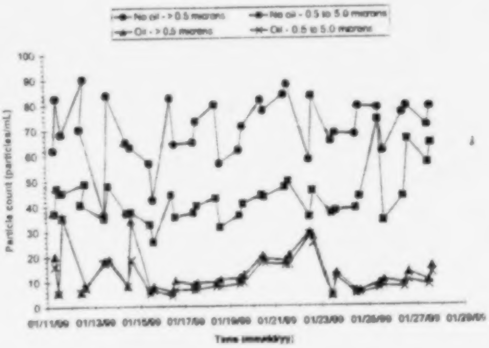

Figure 2 Dust particle counts in both control and oil sprinkled rooms from January 11th to 27th, 1999.

Table I Average dust reduction from January 11th to 27th, 1999.

Measurement technique	Dust reduction (%)
Dust mass concentration	79
Particle counts	
Respirable dust (0.5 to 5.0 µm)	73
Inhalable dust (≥ 0.5 µm)	80

ENTERPRISE RETURNS MODULE

Project 99-02

Revenues	Default	Oil Sprinkling	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00
Capital Asset Values	Default	Oil Sprinkling	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	932,548	-$0.54
Finisher Facilities	1,265,993	1,273,493	-$0.54
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,030,069	5,045,069	-$1.08
Size of Operations (Sows)	Default	Oil Sprinkling	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	317,931	$0.00
Total Feed	818,620	818,620	$0.00
	58.72		
	Default	Oil Sprinkling	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	108,051	-$0.08
Interest and Deprec: Finisher	145,917	147,091	-$0.08
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,849	-$0.01
Property tax	16,033	16,033	$0.00
Total Fixed Costs	722,003	724,488	-$0.17

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Oil Sprinkling
Operating Interest	24,107	24,107
Total Operating	1,383,254	1,383,254
Total Costs	2,105,257	2,107,742
	5 Year Average Feed Cost	
Gross Margin	741,299	741,299
Net Earnings	19,296	16,812
EBITDA	592,863	592,727
ROA	0.38%	0.33%
EBITDA/Sales	27.91%	27.90%
Net Earnings per Hog	$1.38	$1.21

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.17)

ENTERPRISE RETURNS MODULE

Project 99-02

Revenues:	Default	Oil Sprinkling	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Default	Oil Sprinkling	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	932,548	-$0.54
Finisher Facilities	1,265,993	1,273,493	-$0.54
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,030,069**	**5,045,069**	-$1.08

Size of Operations (Sows)	Default	Oil Sprinkling	
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Sow and Boar Diets	130,939	130,939	$0.00
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Grower Diets	170,889	170,889	$0.00
Finisher Diets	317,931	317,931	$0.00
Total Feed	818,620	818,620	$0.00
	58.72		

Misc. Costs:	Default	Oil Sprinkling	
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
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Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
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Interest and Deprec: Finisher	145,917	147,091	-$0.08
Management Salaries	94,723	94,723	$0.00
Insurance	53,713	53,849	-$0.01
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**722,003**	**724,488**	-$0.18

	5 Year Average Feed Cost	
Size of Operations (Sows)	Default	Oil Sprinkling
Operating Interest	24,107	24,107
Total Operating	1,383,254	1,383,254
Total Costs	2,105,257	2,107,742
	5 Year Average Feed Cost	
Gross Margin	741,299	741,299
Net Earnings	19,296	16,812
EBITDA	592,863	592,727
ROA	0.38%	0.33%
EBITDA/Sales	27.91%	27.90%
Net Earnings per Hog	$1.38	$1.21

Hog pool price/ckg	$140.00	$140.00
	Difference	($0.18)

THE DE CONTENT OF HULL-LESS BARLEY

Ruurd T. Zijlstra, Dave D. Maenz [1]
John F. Patience

Summary

Hull-less barley is used as a source of energy and amino acids in swine rations in Western Canada but is characterized poorly in terms of DE content. Our objective was to determine the DE content of cleaned hull-less barley in relation to barley, wheat, and triticale. Chemical characteristics were analyzed to enable subsequent calculation of prediction equations

The DE content of cleaned hull-less barley was equal to that of wheat. We were able to predict the DE content of hull-less barley accurately by using starch, neutral-detergent insoluble nitrogen (NDIN) and neutral-detergent fiber (NDF) analyses.

The DE content of clean hull-less barley is comparable to wheat.

Introduction

Hull-less barley is an increasingly important energy and amino acid source for grower-finisher pigs in Western Canada, but its nutritional value has been characterized poorly. The DE content has been determined in samples that were not cleaned properly or in samples of which hull content in the sample was not reported.

For this study, five varieties of hull-less barley were grown on two separate experimental fields in Saskatchewan. The objective was to relate DE content of hull-less barley to other cereal grains and with chemical characteristics to enable subsequent calculation of prediction equations.

Experimental Procedures

As a component of a collaborative project with the Prairie Feed Resource Centre, hull-less barley was cleaned and analyzed for crude protein (CP), acid-detergent fiber (ADF), NDF, ash, ether extract (EE), NDIN, starch, and DE content. Regression analysis was used to develop relations between DE content and chemical composition.

Results and Discussion

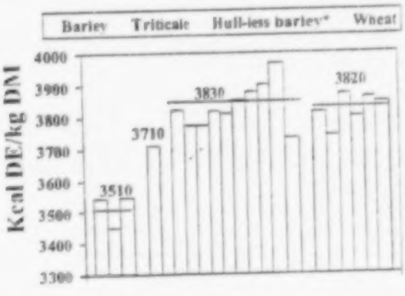
The DE content of cleaned hull-less barley was equal to that of wheat (Figure 1). The difference between the DE content of hull-less barley and barley was around 400 kcal/kg on a DM basis, suggesting that for each 25 per cent additional hulls in the sample the DE content of hull-less barley might be reduced by 100 kcal DE/kg DM. Using starch, NDIN, and NDF (all three on DM-basis), an accurate ($R^2 = 0.88$) prediction equation could be developed: DE (kcal/ kg DM) = 2231 + 22*per cent starch + 636*per cent NDIN − 42*per cent NDF. Equations using CP with ADF, NDF, CF, or EE did not results in accurate predictions of DE content.

Implications

Results indicate that the DE content of cleaned hull-less barley is equal to that of wheat. This also means that uncleaned hull-less barley will have a lesser value than wheat and that the amount of hulls remaining in the sample should be taken into consideration on a weight basis for diet formulation or price paid. The DE content of hull-less barley could be predicted accurately; however, the prediction will be expensive to perform.

Acknowledgements

Strategic funding was provided by Sask Pork, Alberta Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund. The presented work was supported financially by College of Agriculture First and Best Funds provided by the Saskatchewan Wheat Pool.



* Hull-less barley was cleaned to contain 0% hulls

Figure 1. The DE content of cleaned hull-less barley in contrast to wheat, barley, and triticale.

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[1] Prairie Feed Resource Centre, University of Saskatchewan

ENTERPRISE RETURNS MODULE

Project 99-01

Revenues	Wheat Diet	Hulless Diet @ $10/mt discount	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values	Wheat Diet	Hulless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	170,889	164,492	$0.46
Finisher Diets	306,776	297,996	$0.63
Total Feed	807,465	787,006	$1.47
	57.92		

	Wheat Diet	Hulless Diet @ $10/mt discount	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount
Operating Interest	23,909	23,546
Total Operating	1,371,902	1,351,079
Total Costs	2,092,418	2,071,596
	5 Year Average Feed Cost	
Gross Margin	752,652	773,474
Net Earnings	32,136	52,958
EBITDA	604,335	625,157
ROA	0.64%	1.06%
EBITDA/Sales	28.45%	29.43%
Net Earnings per Hog	$2.30	$3.8[illegible]

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.47

ENTERPRISE RETURNS MODULE

Project 99-03

Revenues	Wheat Diet	Hulless Diet @ $10/mt discount	Difference
Market Hogs	2.063.899	2.063.899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values	Wheat Diet	Hulless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
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Boars	13.800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
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Total Feed	807,465	787,006	$1.47
	57.92		

	Wheat Diet	Hulless Diet @ $10/mt discount	
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5 Year Average Feed Cost		
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	5 Year Average Feed Cost	
Gross Margin	752,652	773,474
Net Earnings	32,136	52,958
EBITDA	604,335	625,157
ROA	0.64%	1.06%
EBITDA/Sales	28.45%	29.43%
Net Earnings per Hog	$2.30	$3.80

Hog pool price/ckg	$140.00	$140.00

Difference $1.49

■ Appendix III – Prairie Swine Centre Phase Feeding Analysis

Response of Growing-Finishing Pigs to Dietary Energy Concentration

J.F. Patience[1], A.D. Beaulieu[1], N. Williams[2], and D.Gillis[1]

Summary

The objective of this experiment was to develop an energy response curve for pigs in the growing and finishing phases of production. The diets varied in DE content (3.1, 3.2, 3.3, 3.4 and 3.6 Mcal DE/kg) and were fed from 25 kg to market. Feeding lower energy, lower cost diets, had no effect on ADG or on loin thickness, but did improve feed efficiency and reduced backfat thickness. These results indicate that lower energy diets may be used to increase net income. The applicability of these results amongst a diversity of commercial herds probably depends on feed intake, and the ability of pigs to increase feed intake on the lower energy diets. Nonetheless, the potential for substantially increasing net income warrants careful consideration of dietary energy levels during the growout period. In this experiment, return over feed cost varied by more than $10 per pig across the 5 dietary treatments.

Introduction

The primary objective of pork production is to produce lean meat in a cost effective and sustainable manner. Because energy is considered to be the most important driver of growth in the diet, achieving the full genetic potential for growth in the modern pig requires a clear and definitive understanding of the energy response curve in all phases of production. Despite the importance of energy in the design of commercial feeding programs, and the impact that daily intake has on energy supply, there has been surprisingly little information developed on animal response to energy intake. The little information that is available tends to emphasize whole body growth and reveals little in terms of the partitioning of energy into protein, lipid, water and ash. Establishing responses to nutrient intake levels is particularly critical in defining feeding programs to maximize carcass quality.

Experimental Procedure

Five experimental treatments were employed : 3.1, 3.2, 3.3, 3.4 and 3.6 Mcal DE/kg. This range covers that which might be reasonably used in commercial practice, although both the lowest and highest DE values would be unusual. Diets were formulated to ensure that amino acids were not limiting the response to energy; barrows followed a separate feeding regime as compared to gilts, such that the digestible lysine:DE ratios were 2.80, 2.45 and 1.95 g/Mcal for barrows and 2.90, 2.55 and 2.05 g/Mcal for 25 to 50, 50 to 80 and 80 to 120 kg BW, respectively. Diet DE was constant within a treatment for the complete growout period. Diets were based on barley and soymeal and, depending on the energy level, incorporated varying amounts of wheat and canola oil.

> *"In this trial, feeding lower energy, lower cost diets had no effect on ADG or on loin thickness, but did improve feed efficiency, and reduced backfat thickness."*

Table 1. The effect of dietary energy density on body weight, ADG, ADFI and feed conversion over 3 phases of growth.

	Diet (Measured DE, Mcal/kg[1])						
Parameter	3.09	3.24	3.34	3.42	3.57	SEM	Regression
			Phase 1				
Wt, kg (day 0)	31.17	31.06	31.52	31.19	31.08	0.24	ns[2]
ADG, kg/d	0.95	0.97	0.98	0.98	0.99	0.01	ns
ADFI, kg/d	1.95	1.95	1.91	1.88	1.87	0.03	ns
FCE, gain:feed	0.49	0.50	0.52	0.52	0.53	0.01	L
			Phase 2				
Wt, kg (day 0)	53.15	52.97	53.38	53.39	53.48	0.32	ns
ADG, kg/d	1.04	1.08	1.10	1.06	1.06	0.02	ns
ADFI, kg/d	2.74	2.72	2.74	2.51	2.51	0.04	ns
FCE, gain:feed	0.38	0.40	0.41	0.41	0.43	0.01	L
			Phase 3				
Wt, kg (day 0)	80.10	79.47	80.30	80.16	80.22	0.44	ns
Wt, kg (end)	115.07	115.51	115.26	115.02	115.58	0.41	ns
ADG, kg/d	1.04	1.08	1.10	1.07	1.06	0.02	ns
ADFI, kg/d	3.29	3.19	3.20	3.05	2.94	0.05	ns
FCE, gain:feed	0.30	0.32	0.32	0.33	0.35	0.01	L
			Overall				
ADG, kg/d	1.00	1.02	1.03	1.01	1.05	0.01	ns
ADFI, kg/d	2.76	2.69	2.67	2.59	2.49	0.03	L
FCE, gain:feed	0.36	0.38	0.38	0.39	0.42	0.01	L

[1]Refers to the energy concentration which was determined experimentally at the mid-point of each phase.

[2]ns: the response to dietary energy level was not linear (P>0.05). L: a significant response to dietary energy level was observed (P < 0.05).

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[1] Prairie Swine Centre Inc. [2] PIC Franklin, Kentucky, USA

Results and Discussion

Energy density of the diet had no effect on ADG during any phase, or when calculated over the entire experimental period (Table 1). Feed intake declined as the energy density of the diet increased and feed efficiency was improved. Increasing the energy density of the diet resulted in a reduced lean yield and reduced backfat thickness (Table 2); surprisingly there was no effect on carcass value or on carcass premiums.

It is important to note that by commercial standards, pigs on this experiment exhibited a high feed intake and this could explain the lack of growth response to increases in dietary energy concentration. If feed intake had been lower, the response of the pigs to dietary energy concentration may have been different. A similar experiment is presently being conducted at a commercial farm to test this hypothesis.

Table 2. The effect of dietary energy density, gender and initial bodyweight on carcass value, days on test and feed cost over 3 phases of growth.

	Diet (Measured DE, Mcal/kg)						
Parameter	3.09	3.24	3.34	3.42	3.57	SEM	Reg
Settlement Wt. (kg)	89.91	90.01	90.88	90.2	91.22	0.37	L
Index	113.81	112.91	113.45	111.70	113.24	0.48	ns
Yield	61.58	61.13	60.88	61.14	60.63	0.18	L
Fat, mm	16.83	17.79	18.33	18.62	19.39	0.34	ns
Lean, mm	61.65	60.55	62.72	60.25	61.06	1.06	ns
Price, $/pig	1.10	1.10	1.10	1.10	1.10	0.01	ns
Value, $/pig	111.36	111.63	111.67	110.20	112.75	1.16	ns
Premium, $/pig	5.56	5.33	5.53	5.06	5.00	0.18	L
	Days on Test						
Phase 1	23.3	23.0	22.8	22.9	22.9	0.48	ns
Phase 2	25.9	24.8	24.6	25.0	25.0	0.49	ns
Phase 3	35.4	35.8	36.8	34.6	34.0	1.07	ns
	Feed Cost, $/pig						
Phase 1	8.36	8.96	9.38	10.39	11.36	0.19	L
Phase 2	12.00	12.70	13.93	14.81	15.46	0.25	L
Phase 3	17.40	19.13	21.85	21.82	22.70	0.55	L
Total	37.76	40.76	45.16	47.03	49.52	0.61	L

[1] ns: the response to dietary energy level was not linear (P>0.05), L: a significant response to dietary energy level was observed (P < 0.05)

Conclusion

In this trial, feeding lower energy, lower cost diets had no effect on ADG or on loin thickness, but did improve feed efficiency, and reduced backfat thickness. This indicates that lower energy diets may be used to increase net income. This experiment was conducted in an environment of high feed intake, and different results may accrue under conditions of lower feed intake. At the time of this trial, the lowest energy diet increased return over feed cost by more than $10 per pig sold, as compared to the highest energy diet.

Acknowledgements

Strategic funding provided by Sask Pork, Alberta Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund. Support for this experiment from PIC is greatly appreciated.

"The lowest energy diet increased return over feed cost by more than $10 per pig sold."

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	3.57 DE	3.09 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	3.57 DE	3.09 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	3.57 DE	3.09 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	184,608	$1.02
Grower Diets	184,394	148,338	$2.59
Finisher Diets	309,485	235,461	$5.31
Total Feed	823,679	699,346	$8.92
	59.08		

	3.57 DE	3.09 DE	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.57 DE	3.09 DE
Operating Interest	24,197	21,992
Total Operating	1,388,403	1,261,865
Total Costs	2,108,920	1,982,381
	5 Year Average Feed Cost	
Gross Margin	736,150	862,689
Net Earnings	15,634	142,172
EBITDA	587,833	714,371
ROA	0.31%	2.83%
EBITDA/Sales	27.67%	33.62%
Net Earnings per Hog	$1.12	$10.20

Hog pool price/ckg	$140.00	$140.00

Difference $9.0762

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues:	3.57 DE	3.09 DE	Difference
Market Hogs	2.063.899	2.063.899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10.660	10.660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00
Capital Asset Values:	3.57 DE	3.09 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	3.57 DE	3.09 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	184,608	$1.02
Grower Diets	170,889	137,473	$2.40
Finisher Diets	306,776	233,400	$5.26
Total Feed	807,465	686,421	$8.68
	57.92		
	3.57 DE	3.09 DE	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
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Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.57 DE	3.09 DE
Operating Interest	23,909	21,762
Total Operating	1,371,902	1,248,710
Total Costs	2.092.418	1,969,227
	5 Year Average Feed Cost	
Gross Margin	752,652	875,843
Net Earnings	32,136	155,327
EBITDA	604,335	727,526
ROA	0.64%	3.10%
EBITDA/Sales	28.45%	34.24%
Net Earnings per Hog	$2.30	$11.14

Hog pool price/ckg	$140.00	$140.00
	Difference	$8.84

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	3.57 DE	3.09 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanling			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
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Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
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Finisher Diets	309,485	235,461	$5.31
Total Feed	823,679	699,346	$8.92
	59.08		
	3.57 DE	3.09 DE	
Misc. Costs:			
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Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	3.57 DE	3.09 DE
Operating Interest	24,197	21,992
Total Operating	1,388,402	1,261,865
Total Costs	2,108,920	1,982,381
	5 Year Average Feed Cost	
Gross Margin	736,150	862,689
Net Earnings	15,634	142,172
EBITDA	587,833	714,371
ROA	0.31%	2.83%
EBITDA/Sales	27.67%	33.62%
Net Earnings per Hog	$1.12	$10.20

Hog pool price/ckg	$140.00	$140.00

Difference: $9.076

ENTERPRISE RETURNS MODULE (6 Phas)

	3.57 DE	3.09 DE	Difference
Revenues			
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

	3.57 DE	3.09 DE	
Capital Asset Values			
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	3.57 DE	3.09 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	184,608	$1.02
Grower Diets	170,889	137,473	$2.40
Finisher Diets	306,776	233,400	$5.26
Total Feed	807,465	686,421	$8.68
	57.92		
	3.57 DE	3.09 DE	

	3.57 DE	3.09 DE	
Misc. Costs:			
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Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	

	5 Year Average Feed Cost	
Size of Operations (Sows)	3.57 DE	3.09 DE
Operating Interest	23,909	21,762
Total Operating	1,371,902	1,248,710
Total Costs	2,092,418	1,969,227
	5 Year Average Feed Cost	
Gross Margin	752,652	875,843
Net Earnings	32,136	155,327
EBITDA	604,335	727,526
ROA	0.64%	3.10%
EBITDA/Sales	28.45%	34.24%
Net Earnings per Hog	$2.30	$11.14
Hog pool price/ckg	$140.00	$140.00
	Difference	$8.84

ENTERPRISE RETURNS MODULE (Phas)

	3.57 DE	3.09 DE	Difference
Revenues:			$0.00
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

	3.57 DE	3.09 DE	
Capital Asset Values:			
Farrowing Facilities	1,766,885	1,766,885	$0.00
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Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	3.57 DE	3.09 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	184,608	$1.02
Grower Diets	166,763	134,154	$2.34
Finisher Diets	306,051	232,849	$5.25
Total Feed	802,614	682,550	$8.61
	57.57		

	3.57 DE	3.09 DE	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
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Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	3.57 DE	3.09 DE
Operating Interest	23,823	21,694
Total Operating	1,366,964	1,244,771
Total Costs	2,087,481	1,965,287
	5 Year Average Feed Cost	
Gross Margin	757,589	879,783
Net Earnings	37,073	159,266
EBITDA	609,272	731,466
ROA	0.74%	3.17%
EBITDA/Sales	28.68%	34.43%
Net Earnings per Hog	$2.66	$11.42

Hog pool price/ckg	$140.00	$140.00
	Difference	$8.76

ENTERPRISE RETURNS MODULE (Phas)

			Difference
Revenues:	3.57 DE	3.09 DE	
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values:	3.57 DE	3.09 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	3.57 DE	3.09 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	197,723	$0.08
Grower Diets	159,421	128,200	$2.24
Finisher Diets	308,613	235,764	$5.23
Total Feed	797,834	692,625	$7.55
	57.23		

Misc. Costs:	3.57 DE	3.09 DE	
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc. Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows	3.57 DE	3.09 DE
Operating Interest	23,738	21,872
Total Operating	1,362,100	1,255,025
Total Costs	2,082,616	1,975,541
	5 Year Average Feed Cost	
Gross Margin	762,454	869,529
Net Earnings	41,937	149,012
EBITDA	614,137	721,212
ROA	0.84%	2.97%
EBITDA/Sales	28.91%	33.95%
Net Earnings per Hog	$3.01	$10.69

Hog pool price/ckg	$140.00	$140.00
	Difference	$7.68

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	3.57 DE	3.09 DE	Difference
Market Hogs	2,063,899	2,063,899	$0.0
Weaners/weanling			$0.0
Cull Sows	49,575	49,575	$0.0
Cull Boars	420	420	$0.0
Manure Sales	10,660	10,660	$0.0
			$0.0
Total Revenues	2,124,554	2,124,554	$0.0
Capital Asset Values:	3.57 DE	3.09 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.0
Nuresery Facilities	814,344	814,344	$0.0
Grower Facilities	925,048	925,048	$0.0
Finisher Facilities	1,252,930	1,252,930	$0.0
Sows	244,000	244,000	$0.0
Boars	13,800	13,800	$0.0
Total Value of Assets	5,017,006	5,017,006	$0.0
Size of Operations (Sows	3.57 DE	3.09 DE	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.0
Nursery Diets	198,861	184,608	$1.02
Grower Diets	166,763	134,154	$2.34
Finisher Diets	306,051	232,849	$5.25
Total Feed	802,614	682,550	$8.61
	57.57		
	3.57 DE	3.09 DE	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.0
Replacement Boars	6,900	6,900	$0.0
Veterinary, Medicine & Supplies	34,855	34,855	$0.0
Maintenenace & Repairs	50,469	50,469	$0.0
Utilities	88,047	88,047	$0.0
Office Supplies	3,485	3,485	$0.0
Marketing & Transportation	69,709	69,709	$0.0
AI Supplies	6,274	6,274	$0.0
Barn Supplies	20,913	20,913	$0.0
Management and Consulting Fees	22,028	22,028	$0.0
Other Misc Costs	697	697	$0.0
Total Misc & Supplies	408,297	408,297	$0.0
Labour:	82,883	82,883	$0.0
Manure Handling	31,660	31,660	$0.0
Water Consumption	17,687	17,687	$0.0
Water and Manure Handling	49,347	49,347	$0.0
Fixed Costs			
Interest and Deprec: Farrowin	210,955	210,955	$0.0
Interest and Deprec: Nurser	93,785	93,785	$0.0
Interest and Deprec: Growe	106,877	106,877	$0.0
Interest and Deprec: Finishe	144,548	144,548	$0.0
Management Salaries	94,723	94,723	$0.0
Insurance	53,594	53,594	$0.0
Property tax	16,033	16,033	$0.0
Total Fixed Costs	720,516	720,516	$0.0

	5 Year Average Feed Cost	
Size of Operations (Sow	3.57 DE	3.09 DE
Operating Interest	23,823	21,694
Total Operating	1,366,964	1,244,771
Total Costs	2,087,481	1,965,287
	5 Year Average Feed Cost	
Gross Margin	757,589	879,783
Net Earnings	37,073	159,267
EBITDA	609,273	731,466
ROA	0.74%	3.17%
EBITDA/Sales	28.68%	34.43%
Net Earnings per Hog	$2.56	$11.42

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.7

ENTERPRISE RETURNS MODULE (Phas)

			Difference
Revenues	3.57 DE	3.09 DE	
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00
Capital Asset Values	3.57 DE	3.09 DE	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	3.57 DE	3.09 DE	
	5 Year Average Feed Cost		
Feed: Average Feed Costs			
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	197,723	$0.08
Grower Diets	159,421	128,200	$2.24
Finisher Diets	308,613	235,764	$5.23
Total Feed	797,834	692,625	$7.55
	57.23		
	3.57 DE	3.09 DE	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows	3.57 DE	3.09 DE
Operating Interest	23,738	21,872
Total Operating	1,362,100	1,255,025
Total Costs	2,082,616	1,975,541
		5 Year Average Feed Cost
Gross Margin	762,454	869,529
Net Earnings	41,937	149,012
EBITDA	614,137	721,212
ROA	0.84%	2.97%
EBITDA/Sales	28.91%	33.95%
Net Earnings per hog	$3.02	$10.65

Hog pool price/ckg	$140.00	$140.00
	Difference	$7.6

Voluntary Feed Intake and Growth Performance between Grower Pigs Fed Diets Containing Mustard Meal or Canola Meal

R.T. Zijlstra[1], D.R. Hickling[2], and J.F. Patience[1]

Summary

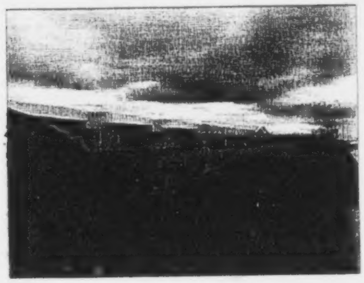
A sample of either mustard meal (Brassica juncea) or regular canola meal was included at 15% in diets fed to grower pigs for 28 days. Pigs fed mustard meal tended to have a 5% better growth performance and had a 2.5%-unit better feed efficiency and an equal feed intake than pigs fed canola meal. Mustard meal might thus be a good opportunity ingredient with minimally a nutritional value equal as canola meal.

Introduction

Mustard meal might be a valuable ingredient for the swine industry domestically and internationally. In some export markets, concerns exist regarding the voluntary feed intake of pigs fed mustard instead of canola meal in their diets. This study therefore compared two diets with either mustard meal or canola meal in the diet at a 15% inclusion rate, which is an inclusion rate that should allow to assess if the feed intake concerns are indeed valid, or not and if growth performance differences exist.

Table 1. Analyzed nutrient content of mustard and canola meal

Nutrient, % as fed	Mustard Meal	Canola Meal
Moisture	7.2	9.9
Ash	7.3	7.0
Crude Protein	42.4	39.0
Acid Detergent fibre	11.4	17.0
Neutral detergent fibre	18.8	27.8
Crude fibre	7.7	11.4
Crude fat	1.4	2.5



Experimental Procedures

A diet containing 15% canola meal was formulated based on 48% corn, 17% soybean meal and 15% wheat was formulated to 3.45 Mcal DE/kg and 2.60 g apparent digestible lysine/Mcal DE. Replacing canola meal 1:1 with mustard meal created a diet containing 15% mustard meal. The pelleted diets were each fed for 28 days to grower pigs housed 5 pigs per pen.

Results and Discussion

The standard chemical characteristics of mustard meal and canola meal are listed in Table 1.

For each of the four weeks of the experiment, voluntary or average daily feed intake of the grower pigs increased gradually, and differences in voluntary feed intake were not observed between pigs fed mustard meal or canola meal (Table 2).

For the first three weeks of the experiment, average daily gain and feed efficiency did not differ statistically between pigs fed mustard meal or canola meal (P > 0.10). However, pigs fed mustard meal grew 17% more and had a 6-% unit higher feed efficiency during the last week of the experiment (P < 0.05), resulting in an overall tendency for pigs fed mustard meal to grow faster than pigs fed canola meal.

Based on these results for feed intake and gain, mustard meal had a higher content of digestible nutrients than canola meal.

Table 2. Voluntary feed intake and growth performance of grower pigs fed either mustard or canola meal

Variable	Mustard Meal	Canola Meal
Average daily fed intake (g/d)		
Day 1-7	1,744	1,780
Day 8-14	1,892	1,937
Day 15-21	1,960	1,979
Day 22-28	2,163	2,129
Total: Day 1-28	1,940	1,956
Average daily gain (g/d)		
Day 1-7	981	1,001
Day 8-14	861	872
Day 15-21	947	889
Day 22-28	964[a]	825[b]
Total: Day 1-28	939[A]	897[B]
Feed efficiency (%)		
Day 1-7	55.9	56.3
Day 8-14	45.4	44.9
Day 15-21	48.4	45.4
Day 22-28	44.6[a]	38.8[b]
Total: Day 1-28	48.5[a]	46.0[b]

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[1] Prairie Swine Centre Inc. Saskatoon, SK. [2] Canola Council of Canada, Winnipeg, MB

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Canola Meal	Mustard Meal	Difference
Market Hogs	2,063,899	2,080,054	$1.16
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,140,708	$1.16

Capital Asset Values:	Canola Meal	Mustard Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Canola Meal	Mustard Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	184,394	183,078	$0.09
Finisher Diets	309,485	309,485	$0.00
Total Feed	823,679	822,363	$0.09
	59.08		

	Canola Meal	Mustard Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Canola Meal	Mustard Meal
Operating Interest	24,197	24,173
Total Operating	1,388,403	1,387,064
Total Costs	2,108,920	2,107,580
	5 Year Average Feed Cost	
Gross Margin	736,150	753,645
Net Earnings	15,634	33,128
EBITDA	587,833	605,327
ROA	0.31%	0.66%
EBITDA/Sales	27.67%	28.28%
Net Earnings per Hog	$1.12	$2.38

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.25

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Canola Meal	Mustard Meal	Difference
Market Hogs	2,063,895	2,080,054	$1.16
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,140,708	$1.16

Capital Asset Values	Canola Meal	Mustard Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nursery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Canola Meal	Mustard Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	184,394	183,078	$0.09
Finisher Diets	309,485	309,485	$0.00
Total Feed	823,679	822,363	$0.09
	59.08		

	Canola Meal	Mustard Meal	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,722	94,722	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Canola Meal	Mustard Meal
Operating Interest	24,197	24,173
Total Operating	1,388,404	1,387,064
Total Costs	2,108,920	2,107,580
		5 Year Average Feed Cost
Gross Margin	736,150	753,643
Net Earnings	15,634	33,128
EBITDA	587,833	605,327
ROA	0.31%	0.66%
EBITDA/Sales	27.67%	28.28%
Net Earnings per Hog	$1.12	$2.38

Hog base price/ckg	$140.00	$140.00

Difference $1.26

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues:	Canola Meal	Mustard Meal	Difference
Market Hogs	2,063,899	2,080,049	$1.16
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,140,703	$1.16

Capital Asset Values:	Canola Meal	Mustard Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Canola Meal	Mustard Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	169,669	$0.09
Finisher Diets	306,776	306,776	$0.00
Total Feed	807,465	806,245	$0.09
	57.92		

	Canola Meal	Mustard Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc. & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec. Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Canola Meal	Mustard Meal
Operating Interest	23,909	23,888
Total Operating	1,371,902	1,370,660
Total Costs	2,092,418	2,091,177
	5 Year Average Feed Cost	
Gross Margin	752,652	770,043
Net Earnings	32,136	49,526
EBITDA	604,335	621,726
ROA	0.64%	0.99%
EBITDA/Sales	28.45%	29.04%
Net Earnings per Hog	$2.30	$3.55

Hog pool price/ckg	$140.00	$140.00
Difference		$1.2474

ENTERPRISE RETURNS MODULE (Phas)

	Canola Meal	Mustard Meal	Difference
Revenues:			
Market Hogs	2,063,899	2,080,031	$1.16
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,140,686	$1.16

	Canola Meal	Mustard Meal	
Capital Asset Values:			
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Canola Meal	Mustard Meal	
	5 Year Average Feed Cost		
Feed: Average Feed Costs			
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	166,763	165,573	$0.09
Finisher Diets	306,051	306,051	$0.00
Total Feed	802,614	801,424	$0.09
	57.57		

	Canola Meal	Mustard Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

	Canola Meal	Mustard Meal	
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
	Canola Meal	Mustard Meal
Size of Operations (Sows)		
Operating Interest	23,823	23,802
Total Operating	1,366,964	1,365,753
Total Costs	2,087,481	2,086,269
	5 Year Average Feed Cost	
Gross Margin	757,589	774,933
Net Earnings	37,073	54,417
EBITDA	609,272	626,616
ROA	0.74%	1.08%
EBITDA/Sales	28.68%	29.27%
Net Earnings per Hog	$2.66	$3.90
Hog pool price/ckg	$140.00	$140.00
Difference		$1.24

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues	Canola Mea	Mustard Mea	Differenc
Market Hogs	2,063,899	2,080,045	$1.1
Weaners/weanlings			$0.0
Cull Sows	49,575	49,575	$0.0
Cull Boars	420	420	$0.0
Manure Sales	10,660	10,660	$0.0
			$0.0
Total Revenues	2,124,554	2,140,703	$1.1

Capital Asset Values	Canola Mea	Mustard Mea	
Farrowing Facilities	1,766,885	1,766,885	$0.0
Nurserv Facilities	814,344	814,344	$0.0
Grower Facilities	925,048	925,048	$0.0
Finisher Facilities	1,252,930	1,252,930	$0.0
Sows	244,000	244,000	$0.0
Boars	13,800	13,800	$0.0
Total Value of Assets	5,017,006	5,017,006	$0.0

Size of Operations (Sows	Canola Mea	Mustard Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.0
Nursery Diets	198,861	198,861	$0.0
Grower Diets	170,889	169,669	$0.0
Finisher Diets	306,776	306,776	$0.0
Total Feed	807,465	806,245	$0.0
	57.92		

	Canola Mea	Mustard Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.0
Replacement Boars	6,900	6,900	$0.0
Veterinary, Medicine & Supplies	34,855	34,855	$0.0
Maintenenace & Repairs	50,469	50,469	$0.0
Utilities	88,047	88,047	$0.0
Office Supplies	3,485	3,485	$0.0
Marketing & Transportation	69,709	69,709	$0.0
AI Supplies	6,274	6,274	$0.0
Barn Supplies	20,913	20,913	$0.0
Management and Consulting Fees	22,028	22,028	$0.0
Other Misc Costs	697	697	$0.0
Total Misc & Supplies	408,297	408,297	$0.0

Labour:	82,883	82,883	$0.0

Manure Handling	31,660	31,660	$0.0
Water Consumption	17,687	17,687	$0.0
Water and Manure Handling:	49,347	49,347	$0.0

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.0
Interest and Deprec: Nursery	93,785	93,785	$0.0
Interest and Deprec: Grower	106,877	106,877	$0.0
Interest and Deprec: Finisher	144,548	144,548	$0.0
Management Salaries	94,723	94,723	$0.0
Insurance	53,594	53,594	$0.0
Property tax	16,033	16,033	$0.0
Total Fixed Costs	720,516	720,516	$0.0

5 Year Average Feed Cost		
Size of Operations (Sows	Canola Mea	Mustard Mea
Operating Interest	23,909	23,888
Total Operating	1,371,902	1,370,660
Total Costs	2,092,418	2,091,177
	5 Year Average Feed Cost	
Gross Margin	752,652	770,043
Net Earnings	32,136	49,526
EBITDA	604,335	621,726
ROA	0.64%	0.99%
EBITDA/Sales	28.45%	29.04%
Net Earnings per pig	$2.3	$3.5

Hog pool price/ckg	$140.0	$140.0

Difference $1.247

ENTERPRISE RETURNS MODULE (Phas)

	Canola Meal	Mustard Meal	Difference
Revenues:	2,063,899	2,080,031	$1.16
Market Hogs			$0.00
Weaners/weanlings	49,575	49,575	$0.00
Cull Sows	420	420	$0.00
Cull Boars	10,660	10,660	$0.00
Manure Sales			$0.00
	2,124,554	2,140,686	$1.16
Total Revenues			

	Canola Meal	Mustard Meal	
Capital Asset Values	1,766,885	1,766,885	$0.00
Farrowing Facilities	814,344	814,344	$0.00
Nureserv Facilities	925,048	925,048	$0.00
Grower Facilities	1,252,930	1,252,930	$0.00
Finisher Facilities	244,000	244,000	$0.00
Sows	13,800	13,800	$0.00
Boars	5,017,006	5,017,006	$0.00
Total Value of Assets			

Size of Operations (Sows)	Canola Meal	Mustard Meal	
	5 Year Average Feed Cost		
Feed: Average Feed Costs	130,939	130,939	$0.00
Sow and Boar Diets	198,861	198,861	$0.00
Nursery Diets	166,763	165,573	$0.09
Grower Diets	306,051	306,051	$0.00
Finisher Diets	802,614	801,424	$0.09
Total Feed	57.57		

	Canola Meal	Mustard Meal	
Misc. Costs:	104,920	104,920	$0.00
Replacement Gilts	6,900	6,900	$0.00
Replacement Boars	34,855	34,855	$0.00
Veterinary, Medicine & Supplies	50,469	50,469	$0.00
Maintenenace & Repairs	88,047	88,047	$0.00
Utilities	3,485	3,485	$0.00
Office Supplies	69,709	69,709	$0.00
Marketing & Transportation	6,274	6,274	$0.00
AI Supplies	20,913	20,913	$0.00
Barn Supplies	22,028	22,028	$0.00
Management and Consulting Fees	697	697	$0.00
Other Misc Costs	408,297	408,297	$0.00
Total Misc & Supplies			
	82,883	82,883	$0.00
Labour:			
	31,660	31,660	$0.00
Manure Handling	17,687	17,687	$0.00
Water Consumption	49,347	49,347	$0.00
Water and Manure Handling:			

Fixed Costs:	210,955	210,955	$0.00
Interest and Deprec: Farrowing	93,785	93,785	$0.00
Interest and Deprec: Nursery	106,877	106,877	$0.00
Interest and Deprec: Grower	144,548	144,548	$0.00
Interest and Deprec: Finisher	94,723	94,723	$0.00
Management Salaries	53,594	53,594	$0.00
Insurance	16,033	16,033	$0.00
Property tax	720,516	720,516	$0.00
Total Fixed Costs			

	5 Year Average Feed Cost	
	Canola Meal	Mustard Meal
Size of Operations (Sows)	23,823	23,802
Operating Interest	1,366,964	1,365,753
Total Operating	2,087,481	2,086,269
Total Costs		
	5 Year Average Feed Cost	
	757,589	774,933
Gross Margin	37,073	54,417
Net Earnings	609,272	626,616
EBITDA	0.74%	1.08%
ROA	28.68%	29.27%
EBITDA/Sales	$2.66	$2.90
Net Earnings per Hog		

Hog pool price/ckg	$140.00	$140.00

Difference $1.24

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Canola Meal	Mustard Meal	Difference
Market Hogs	2,063,899	2,079,663	$1.13
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,140,318**	$1.13

Capital Asset Values:	Canola Meal	Mustard Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Canola Meal	Mustard Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	159,421	158,283	$0.08
Finisher Diets	308,613	308,613	$0.00
Total Feed	797,834	796,696	$0.08
	57.23		

	Canola Meal	Mustard Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	Canola Meal	Mustard Meal
Operating Interest	23,738	23,718
Total Operating	1,362,100	1,360,942
Total Costs	2,082,616	2,081,458
	5 Year Average Feed Cost	
Gross Margin	762,454	779,376
Net Earnings	41,932	58,860
EBITDA	614,137	631,059
ROA	0.84%	1.17%
EBITDA/Sales	28.91%	29.48%
Net Earnings per Hog	$3.01	$4.22

Hog pool price/ckg	$140.00	$140.00

Difference $1.2138

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Canola Meal	Mustard Meal	Difference
Market Hogs	2,063,899	2,079,663	$1.13
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,140,318	$1.13

Capital Asset Values:	Canola Meal	Mustard Meal	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Canola Meal	Mustard Meal	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	159,421	158,283	$0.08
Finisher Diets	308,613	308,613	$0.00
Total Feed	797,834	796,696	$0.08
	57.23		

	Canola Meal	Mustard Meal	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Canola Meal	Mustard Meal
Operating Interest	23,738	23,718
Total Operating	1,362,100	1,360,942
Total Costs	2,082,616	2,081,458
	5 Year Average Feed Cost	
Gross Margin	762,454	779,376
Net Earnings	41,937	58,860
EBITDA	614,137	631,059
ROA	0.84%	1.17%
EBITDA/Sales	28.91%	29.48%
Net Earnings per Hog	$3.01	$4.22

Hog pool price/ckg	$140.00	$140.00

Difference $1.2138

The Effect of Starter Feeding Regimen on Variability in Bodyweight and Performance in the Nursery

A.D. Beaulieu, J.F. Patience, R.T. Zijlstra, and R. Mohr

Summary

Variability in growth and performance is a concern to pork producers due to the associated negative impact on revenues and expenditures. This experiment was designed to determine the effect of starter program on the variability in animal weights at nursery exit. Treatments consisted of 4 starter programs, formulated and fed according to manufacturers' specifications from weaning (d 0) to nursery exit (d 50). Overall ADG was similar between programs, however, the ADFI differed thus, feed efficiency was affected by the program used. Variability in pig growth, determined as the coefficient of variation, was not affected by starter program. This was true regardless of the starting weight of the group of pigs. Therefore, although performance may be affected slightly by the use of a specific starter program, the change in performance is uniform across a group; and the variability in body weight at nursery exit will not be affected.

Introduction

Variability in growth and performance is a concern to pork producers due to the associated negative impact on revenues and expenditures. The challenge of reducing the impact of variability on pork production is a serious one and two options are available. The first is to reduce variability and the second is to manage it. If variability is considered to be excessive the implementation of management practices to reduce it will be a reasonable approach.

The starter program has the potential to influence the relative growth of individual pigs within a group by allowing the smaller and/or younger pigs to excel relative to the older and/or larger contemporaries. Variability will be reduced if the feeding regimen allows the smaller pigs to "catch-up" or meet the performance of the larger animals in their cohort. It is recognized that the subject of nursery diet impact on variability is complex; determining whether a feeding program can reduce the impact of variability was considered a first step.

Experimental Procedures

A total of 560 pigs were used in this experiment. This represented all the

Table 1. The effect of starter program on the performance of nursery pigs. The data were indexed to diet A which was arbitrarily assigned a value of 100.

	Treatment					
	A	B	C	D	Mean[a]	SEM[a]
Initial weight, kg	100.00	100.00	100.00	100.00	6.26	0.018
Final weight[b], kg	100.00	100.31	104.37	101.92	32.36	0.341
ADG, kg/d	100.00	100.00	103.15	102.95	0.52	0.008
ADFI[b], kg/d	100.00	99.31	105.82	105.13	0.74	0.009
FCE[b]	100.00	100.57	97.30	99.29	0.70	0.004
Feed cost/kg gain[b]	100.00	104.92	109.84	101.64	0.64	0.006
Feed cost/pig[b]	100.00	104.74	113.89	105.39	16.34	0.193

[a] Calculated from untransformed data
[b] Significant effect due to treatment (P<0.05)

Table 2. The effect of grouping by weaning weight on the performance of nursery pigs.

	Weight Group				
	Lightest	Light	Heavy	Heaviest	SEM
Initial weight, kg	4.93	5.80	6.55	7.76	0.018
Final weight, kg	29.19	31.74	32.94	35.55	0.341
ADG, kg/d	0.479	0.519	0.521	0.545	0.008
ADFI, kg/d	0.665	0.730	0.756	0.800	0.009
FCE[a]	0.719	0.711	0.689	0.681	0.004
Feed cost/kg gain	0.64	0.63	0.64	0.64	0.006
Feed cost/pig[a]	15.29	16.24	16.49	17.33	0.193

[a] Significant effect of weight group (P<0.05)

Table 3 The effect of starter program on the coefficient of variation (CV, %) calculated from body weight[a] within pens. Pigs had been blocked by weight at weaning. The data were indexed to diet A which was arbitrarily assigned a value of 100

	Treatment					
Phase	A	B	C	D	Mean[b]	SEM[b]
d 4	100.00	98.77	101.97	95.08	8.05	0.42
d 7	100.00	89.81	97.98	92.04	8.94	0.65
d 20	100.00	91.37	94.34	95.21	13.13	1.16
d 34	100.00	104.43	83.14	97.59	12.39	0.84
d 50	100.00	94.13	85.43	99.36	10.33	0.68

[a] Calculated from pen data, averaged for each treatment. The overall CV for each nursery room averaged 17.8% at d 0 and 12.6% at d 50

[b] Calculated from untransformed data

Table 4 The effect of grouping by weaning weight on the coefficient of variation (CV, %) calculated from body weight[a].

	Weight Group				
Phase	Lightest	Light	Heavy	Heaviest	SEM
d 4[b]	8.13	8.03	8.29	7.73	0.42
d 7	9.42	8.46	9.23	8.67	0.65
d 20	13.79	12.60	13.01	13.13	1.16
d 34[b]	12.87	13.44	10.70	12.56	0.84
d 50[b]	10.91	10.27	9.32	10.84	0.68

[a] Calculated from pen data, averaged for each weight group. The overall CV for each nursery room averaged 17.8% at d 0 and 12.6% at d 50

[b] Significant effect due to weight group ($P<0.05$)

available pigs from two consecutive weeks of weaning at PSC Elstow Research Farm. The only pigs excluded from the experiment were those deemed to be suffering from an obvious medical or physical problem. The experimental group represents a typical and complete weaning group. Animals were blocked into one of 4 weight groups. The treatments consisted of 4 commercial programs currently in use in Western Canada. The feeding programs were fed according to the manufacturers' directions. The only restriction on the program was the medication, all diets were required to include LS20 at the recommended level.

Piglets were weighed individually when they were placed on test (d0) and on d4, d7, d13, d20, d34 and d50 (nursery exit). The CV was computed within a pen and analyzed as a variable across pens. To ensure confidentiality of participating companies, the performance data from one company was arbitrarily assigned a value of 100, and the data from the other companies is expressed relative to this. Significance was declared at the $P < 0.05$ level.

Results and Discussion.

Starter program had a modest effect on performance (Table 1). However, when examined within specific phases (data not shown), no specific program outperformed the others. There were no starter program by weight group interactions, meaning that a starter program did not elicit an improvement within specific weight groups. Feed cost per pig or per kg of gain did differ between feeding program. Feed costs were based on information provided by the collaborating feed companies and was intended to reflect the price charged to a customer for this program.

As mentioned above, the objective of this experiment was to determine if differences exist among commercial starter programs in terms of their impact on variability at nursery exit (not to determine the "best" commercial starter program, nor examine specific nutrients which impact pig growth during the nursery phase). Although weight group had an effect on CV at nursery exit, starter program had no effect on uniformity. Moreover, there were no interactions of starter program by weight group, implying that within a specific weight group, no starter program consistently improved uniformity.

Implications

Within every weaning group there are some very lightweight pigs. Uniformity at nursery exit will be improved if we can specifically increase the growth rate of these pigs. The effect of starter program was not specific for any

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	5.8kg Wean Wt	7.6 kg Wean Wt	Difference
Market Hogs	2,063,899	2,100,778	$2.65
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,161,433	$2.65

Capital Asset Values:	5.8kg Wean Wt	7.6 kg Wean Wt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	5.8kg Wean Wt	7.6 kg Wean Wt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	218,022	-$1.37
Grower Diets	184,394	188,543	-$0.30
Finisher Diets	309,485	316,449	-$0.50
Total Feed	823,679	853,953	-$2.17
	59.08		

	5.8kg Wean Wt	7.6 kg Wean Wt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc. Supplies	[illegible]	[illegible]	$0.00
Labour:	[illegible]	[illegible]	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	5.8kg Wean Wt	7.6 kg Wean Wt
Operating Interest	24,197	24,734
Total Operating	1,388,403	1,419,214
Total Costs	2,108,920	2,139,730
	5 Year Average Feed Cost	
Gross Margin	736,150	742,219
Net Earnings	15,634	21,702
EBITDA	587,833	593,902
ROA	0.31%	0.43%
EBITDA/Sales	27.67%	27.48%
Net Earnings per Hog	$1.12	$1.56
Hog pool price/ckg	$140.00	$140.00

Difference $0.435

ENTERPRISE RETURNS MODULE (Phas)

Revenues	5.8kg Wean Wt	7.6 kg Wean Wt	Difference
Market Hogs	2,063,899	2,100,778	$2.6
Weaners/weanlings			$0.0
Cull Sows	49,575	49,575	$0.0
Cull Boars	420	420	$0.0
Manure Sales	10,660	10,660	$0.0
			$0.0
Total Revenues	2,124,554	2,161,433	$2.6

Capital Asset Values	5.8kg Wean Wt	7.6 kg Wean Wt	
Farrowing Facilities	1,766,885	1,766,885	$0.0
Nureserv Facilities	814,344	814,344	$0.0
Grower Facilities	925,048	925,048	$0.0
Finisher Facilities	1,252,930	1,252,930	$0.0
Sows	244,000	244,000	$0.0
Boars	13,800	13,800	$0.0
Total Value of Assets	5,017,006	5,017,006	$0.0

Size of Operations (Sows	5.8kg Wean Wt	7.6 kg Wean Wt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.0
Nursery Diets	198,861	218,022	-$1.37
Grower Diets	184,394	188,543	-$0.3
Finisher Diets	309,485	316,449	-$0.5
Total Feed	823,679	853,953	-$2.17
	59.08		

	5.8kg Wean Wt	7.6 kg Wean Wt	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.0
Replacement Boars	6,900	6,900	$0.0
Veterinary, Medicine & Supplies	34,855	34,855	$0.0
Maintenenace & Repairs	50,469	50,469	$0.0
Utilities	88,047	88,047	$0.0
Office Supplies	3,485	3,485	$0.0
Marketing & Transportation	69,709	69,709	$0.0
AI Supplies	6,274	6,274	$0.0
Barn Supplies	20,913	20,913	$0.0
Management and Consulting Fees	22,028	22,028	$0.0
Other Misc Costs	697	697	$0.0
Total Misc & Supplies	408,297	408,297	$0.0
Labour:	82,883	82,883	$0.0
Manure Handling	31,660	31,660	$0.0
Water Consumption	17,687	17,687	$0.0
Water and Manure Handling:	49,347	49,347	$0.0
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.0
Interest and Deprec: Nursery	93,785	93,785	$0.0
Interest and Deprec: Grower	106,877	106,877	$0.0
Interest and Deprec: Finisher	144,548	144,548	$0.0
Management Salaries	94,723	94,723	$0.0
Insurance	53,594	53,594	$0.0
Property tax	16,033	16,033	$0.0
Total Fixed Costs	720,516	720,516	$0.0

5 Year Average Feed Cost		
Size of Operations (Sows	5.8kg Wean Wt	7.6 kg Wean Wt
Operating Interest	24,197	24,734
Total Operating	1,388,40[illegible]	1,419,214
Total Costs	2,108,920	2,139,73[illegible]
		5 Year Average Feed Cost
Gross Margin	736,15[illegible]	742,21[illegible]
Net Earnings	15,634	21,70[illegible]
EBITDA	587,83[illegible]	593,90[illegible]
ROA	0.31%	0.43%
EBITDA/Sales	27.67%	27.48%
Net Earnings per hog	$1.1[illegible]	$1.5[illegible]

Hog base price/ckg	$140.0	$140.0
	Difference	$0.43

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues	5.8kg Wean Wt	7.8kg Wean Wt	Difference
Market Hogs	2,063,899	2,100,777	$2.65
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,161,432**	$2.65
Capital Asset Values:	5.8kg Wean Wt	7.8kg Wean Wt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	5.8kg Wean Wt	7.8kg Wean Wt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	218,022	-$1.37
Grower Diets	170,889	174,734	-$0.28
Finisher Diets	306,776	313,679	-$0.50
Total Feed	807,465	837,374	-$2.15
	57.92		
	5.8kg Wean Wt	7.8kg Wean Wt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	5.8kg Wean Wt	7.8kg Wean Wt
Operating Interest	23,909	24,440
Total Operating	1,371,902	1,402,341
Total Costs	2,092,418	2,122,857
	5 Year Average Feed Cost	
Gross Margin	752,652	759,091
Net Earnings	32,136	38,574
EBITDA	604,335	610,774
ROA	0.64%	0.77%
EBITDA/Sales	28.45%	28.26%
Net Earnings per Hog	$2.30	$2.77

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.4615

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Default	0	Difference
Market Hogs	2,063,899	2,100,778	$2.65
Weaners/weanings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,161,433**	$2.65
Capital Asset Values	Default	0	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	Default	0	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	218,022	-$1.37
Grower Diets	166,763	170,515	-$0.27
Finisher Diets	306,051	312,937	-$0.49
Total Feed	802,614	832,414	-$2.14
	57.57		
	Default	0	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc. Supplies	**408,297**	**408,297**	$0.00
Labour:	**482,883**	**482,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	0
Operating Interest	23,823	24,352
Total Operating	1,366,964	1,397,293
Total Costs	2,087,481	2,117,809
	5 Year Average Feed Cost	
Gross Margin	757,589	764,140
Net Earnings	37,073	43,624
EBITDA	609,272	615,823
ROA	0.74%	0.87%
EBITDA/Sales	28.68%	28.49%
Net Earnings per Hog	$2.66	$3.13

Hog pool price/ckg	$140.00	$140.00

Difference $0.469%

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues	5.8kg Wean Wt	7.8kg Wean Wt	Difference
Market Hogs	2,063,899	2,100,777	$2.6[illegible]
Weaners/weanling			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,161,432	$2.8[illegible]
Capital Asset Values	5.8kg Wean Wt	7.8kg Wean Wt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	5.8kg Wean Wt	7.8kg Wean Wt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	218,022	-$1.37
Grower Diets	170,889	174,734	-$0.2[illegible]
Finisher Diets	306,776	313,679	-$0.5[illegible]
Total Feed	807,465	837,374	-$2.1[illegible]
	57.92		
	5.8kg Wean Wt	7.8kg Wean Wt	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	5.8kg Wean Wt	7.8kg Wean Wt
Operating Interest	23,909	24,44[illegible]
Total Operating	1,371,90[illegible]	1,402,34[illegible]
Total Costs	2,092,41[illegible]	[illegible]
	5 Year Average Feed Cost	
Gross Margin	752,55[illegible]	759,09[illegible]
Net Earnings	32,13[illegible]	38,576
EBITDA	604,33[illegible]	610,774
ROA	0.64%	0.77%
EBITDA/Sales	28.45%	28.2[illegible]%
Net Earnings per Hog	[illegible]	[illegible]

Hog pool price/ckg $140.[illegible] $140.[illegible]

Difference $0.46[illegible]

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Default	D	Difference
Market Hogs	2,063,899	2,100,778	$2.87
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,161,433	$2.87
Capital Asset Values	Default	D	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Default	D	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	218,022	-$1.37
Grower Diets	166,763	170,515	-$0.27
Finisher Diets	306,051	312,937	-$0.49
Total Feed	802,614	832,414	-$2.14
	57.57		
	Default	D	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	D
Operating Interest	23,823	24,352
Total Operating	1,366,964	1,397,293
Total Costs	2,087,481	2,117,809
	5 Year Average Feed Cost	
Gross Margin	757,589	764,140
Net Earnings	37,073	43,624
EBITDA	605,273	615,822
ROA	0.74%	0.87%
EBITDA/Sales	28.68%	28.49%
Net Earnings per Hog	$2.51	[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference: $0.46

ENTERPRISE RETURNS MODULE (Phas)

Revenues	5.8kg Wean Wt	7.6 kg Wean Wt	Difference
Market Hogs	2,063,899	2,100,778	$2.65
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,161,433**	$2.65
Capital Asset Values:	5.8kg Wean Wt	7.6 kg Wean Wt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	5.8kg Wean Wt	7.6 kg Wean Wt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	218,022	-$1.37
Grower Diets	159,421	163,008	-$0.26
Finisher Diets	308,613	315,557	-$0.50
Total Feed	797,834	827,526	-$2.13
	57.23		
	5.8kg Wean Wt	7.6 kg Wean Wt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	0,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc. Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	5.8kg Wean Wt	7.6 kg Wean Wt
Operating Interest	23,738	24,265
Total Operating	1,362,100	1,392,319
Total Costs	2,082,616	2,112,835
	5 Year Average Feed Cost	
Gross Margin	762,454	769,114
Net Earnings	41,937	48,598
EBITDA	614,137	620,797
ROA	0.84%	0.97%
EBITDA/Sales	28.91%	28.72%
Net Earnings per Hog	$3.01	$3.49

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.4777

Feed Processing and Nutritional Quality Among Wheat Classes Fed to Weaned Pigs

Ruurd Zijlstra, David Overend [1], David Hickling [2], P. Howard Simmins [3], and John Patience

Summary

Feed processing and nutritional quality for CPS and durum wheats have traditionally been expected to be lower than for Hard Red Spring (HRS). Performance of weaned pigs was compared among six wheat classes, whilst considering particle size and diet pellet quality. Results indicated that feed processing quality and growth performance did not differ among wheat classes. Weaned pigs fed various classes of wheat including CPS and durum may grow similarly.

Introduction

The processing and nutritional quality of wheat is expected to vary among classes. CPS and durum wheat are currently segregated. A range in wheat protein and fibre or non-starch polysaccharide (NSP) content may partly cause quality variation. The present study was designed to test whether wheat class by itself impacts feed processing or nutritional quality.

Experimental Procedures

Two cultivars from each of six classes (CPS White and Red, HRS, durum, Hard Red Winter (HRW) and Hard White (HW)) were collected (Table 1). Protein ranged from 12.2 to 17.4% and total NSP from 9.0 to 11.5% (Table 2). A 3-week growth and digestibility study was conducted with 12-kg weaned pigs (PIC; 39-day-old; 4 pigs/pen, 12 pens per cultivar), which were fed pelleted 65%-wheat diets (3.5 Mcal DE/kg; 3.4 g dig. lysine/Mcal).

Results and Discussion

Wheat particle size ranged from 536 to 734 mm (10/64"-screen) (Table 2). Pellet Durability Index was 96 for all diets. Feed processing quality was thus excellent for all wheat classes. In the growth study, average daily gain (ADG), average daily feed intake (ADFI), and feed efficiency did not differ among wheat classes for day 0 to 21 (Figure 1). However, some minor differences were observed in the first week. For example, ADG for durum was 9% lower than for HRW, and similar among other classes; ADFI for HW was 7% lower than for HRW, and similar among other classes. Finally, diet energy digestibility (and thus DE content) was lowest for CPS Red (86.5%), medium for CPS White, HRS and HW (87.2 to 87.5%) and highest for HRW and Durum (88.6 & 88.9%) (Figure 2).

Implications

Protein but not NSP content varied among 12 wheat cultivars harvested in western Canada in 2001. Wheat protein content was "corrected for" during diet formulation and did not affect pig performance. Wheat NSP content was low overall, indicating that all 12 wheat samples were of excellent nutritional quality. Still, DE content ranged 7% and was highest for durum. Reductions in ADG and ADFI for CPS and durum wheat were limited to the first two weeks, and did not exist after three weeks.

In conclusion, despite variations in wheat DE content, weaned pigs fed various classes of wheat including CPS and durum performed equally. Wheat class by itself was not a cause for a range in feed processing or nutritional quality.

Acknowledgements

Strategic program funding provided by Sask Pork, Alberta Pork, Manitoba Pork Council, and Saskatchewan Agriculture and Food Development Fund. Project funding was provided by the Canadian Wheat Board, Canadian International Grains Institute, Feed-Rite (Ridley Inc.), Danisco Animal Nutrition, Degussa, and Quality Assured Seeds.

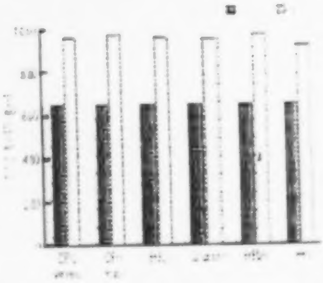

Figure 1: Effects of wheat class on average daily gain (ADG) and feed intake (ADFI) of weaned pigs in the 3-week growth study

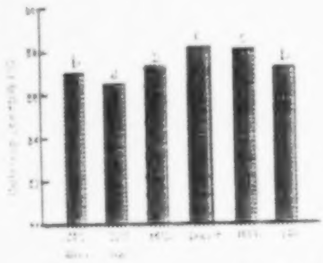

Figure 2: Effect of wheat class on diet energy digestibility measured in weaned pigs

Table 1. The Canadian Wheat Board classes and popular names for the used wheats

Canadian Wheat Board Class	Popular Name
Canadian Prairie Spring White	CPS White
Canadian Prairie Spring Red	CPS Red
Canadian Western Red Spring	Hard Red Spring (HRS)
Canadian Western Amber Durum	Durum
Canadian Western Red Winter	Hard Red Winter (HRW)
Canadian Western Hard White	Hard White (HW)

Table 2. Protein and NSP content and particle size of the ground wheat. Each value represents one of two cultivars per class

Wheat class	Protein (% as is)	Total NSP (% as is)	Particle size (% as is)
CPS White	15.1,16.1	11.3,11.4	591,700
CPS Red	12.4,15.8	11.0,11.3	556,631
HRS	15.4,17.1	10.8,16.5	640,708
Durum	16.3,16.8	9.0,10.1	624,734
HRW	12.2,13.7	9.7,10.9	536,636
HW	16.5,17.4	10.9,11.3	629,724

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[1] Ridley Inc., Mankato, MN

[2] Canadian International Grains Institute, Winnipeg, MB; presently Canola Council of Canada, Winnipeg, MB

[3] Danisco Animal Nutrition, Marlborough, UK

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wheat @ 5 Year Avg. Price	Wheat @ $132.90/mt	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Wheat @ 5 Year Avg. Price	Wheat @ $132.90/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Wheat @ 5 Year Avg. Price	Wheat @ $132.90/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,551	$0.10
Nursery Diets	198,861	196,440	$0.17
Grower Diets	184,394	179,776	$0.33
Finisher Diets	309,485	301,660	$0.56
Total Feed	823,679	807,428	$1.17
	59.08		

	Wheat @ 5 Year Avg. Price	Wheat @ $132.90/mt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc./Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Wheat @ 5 Year Avg. Price	Wheat @ $132.90/mt
Operating Interest	24,197	23,909
Total Operating	1,388,403	1,371,864
Total Costs	2,108,920	2,092,380
	5 Year Average Feed Cost	
Gross Margin	736,150	752,690
Net Earnings	15,634	32,174
EBITDA	587,833	604,373
ROA	0.31%	0.64%
EBITDA/Sales	27.67%	28.45%
Net Earnings per Hog	$1.12	$2.31

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.19

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,551	$0.10
Nursery Diets	198,861	196,440	$0.17
Grower Diets	170,889	166,275	$0.33
Finisher Diets	306,776	300,444	$0.45
Total Feed	807,465	792,711	$1.06
	57.92		

	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veternary, Medicine & Supplies	34,855	34,855	$0.00
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Utilities	88,047	88,047	$0.00
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Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90
Operating Interest	23,909	23,648
Total Operating	1,371,902	1,356,886
Total Costs	2,092,418	2,077,402
	5 Year Average Feed Cost	
Gross Margin	752,652	767,668
Net Earnings	32,136	47,151
EBITDA	604,335	619,351
ROA	0.64%	0.94%
EBITDA/Sales	28.45%	29.15%
Net Earnings per Hog	$2.30	$3.38

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.08

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Wheat @ 5 Year Avg. Price	Wheat @ $132.90/mt	Difference
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Size of Operations (Sows)	Wheat @ 5 Year Avg. Price	Wheat @ $132.90/mt
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Total Operating	1,388,403	1,371,864
Total Costs	2,108,920	2,092,380
		5 Year Average Feed Cost
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Net Earnings	15,634	32,174
EBITDA	587,833	604,373
ROA	0.31%	0.64%
EBITDA/Sales	27.67%	28.45%
Net Earnings per Hog	$1.12	$2.31

Hog pool price/ckg	$140.00	$140.00

Difference $1.19

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	Difference
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			$0.00
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Capital Asset Values:	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

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Total Feed	807,465	792,711	$1.06
	57.92		

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Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows	Avg. Wheat Price @$140.40	Avg. Wheat Price @$132.90
Operating Interest	23,909	23,648
Total Operating	1,371,902	1,356,886
Total Costs	2,092,418	2,077,402
	5 Year Average Feed Cost	
Gross Margin	752,652	767,668
Net Earnings	32,136	47,151
EBITDA	604,335	619,351
ROA	0.64%	0.94%
EBITDA/Sales	28.45%	29.15%
Net Earnings per Hog	$2.30	$3.38

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.06

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Default	Wheat @ $132.90/mt	Difference
Market Hogs	2.063.899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10.660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Default	Wheat @ $132.90/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Default	Wheat @ $132.90/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,551	$0.10
Nursery Diets	198,861	196,440	$0.17
Grower Diets	166,763	162,168	$0.33
Finisher Diets	306,051	300,172	$0.42
Total Feed	802,614	788,331	$1.02
	57.57		

	Default	Wheat @ $132.90/mt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
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Total Misc. Supplies	**408,297**	**408,297**	$0.00
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Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Wheat @ $132.90/mt
Operating Interest	23,823	23,570
Total Operating	1.366,964	1,352,428
Total Costs	2,087,481	2,072,944
	5 Year Average Feed Cost	
Gross Margin	757,589	772,126
Net Earnings	37,073	51,609
EBITDA	609,272	623,808
ROA	0.74%	1.03%
EBITDA/Sales	28.68%	29.36%
Net Earnings per Hog	$2.56	$3.70

Hog pool price/ckg	$140.00	$140.00

Difference: $1.04

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Default	Wheat @ $132.90/mt	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values:	Default	Wheat @ $132.90/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
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Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,551	$0.10
Nursery Diets	198,861	196,440	$0.17
Grower Diets	159,421	155,109	$0.31
Finisher Diets	308,613	302,317	$0.45
Total Feed	797,834	783,417	$1.03
	57.23		

	Default	Wheat @ $132.90/mt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
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Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Wheat @ $132.90/mt
Operating Interest	23,738	23,483
Total Operating	1,362,100	1,347,427
Total Costs	2,082,616	2,067,944
	5 Year Average Feed Cost	
Gross Margin	762,454	777,126
Net Earnings	41,937	56,610
EBITDA	614,137	628,809
ROA	0.84%	1.13%
EBITDA/Sales	28.91%	29.60%
Net Earnings per Hog	$3.01	$4.06

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.05

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Default	Wheat @ $132.90/mt	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanling			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values	Default	Wheat @ $132.90/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows	Default	Wheat @ $132.90/mt	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,551	$0.10
Nursery Diets	198,861	196,440	$0.17
Grower Diets	166,763	162,168	$0.33
Finisher Diets	306,051	300,172	$0.42
Total Feed	802,614	788,331	$1.02
	57.57		

	Default	Wheat @ $132.90/mt	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,465	50,465	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	Default	Wheat @ $132.90/mt
Operating Interest	23,823	23,570
Total Operating	1,366,964	1,352,428
Total Costs	2,087,481	2,072,944
	5 Year Average Feed Cost	
Gross Margin	757,589	772,126
Net Earnings	37,073	51,605
EBITDA	609,272	623,808
ROA	0.74%	1.03%
EBITDA/Sales	28.68%	29.36%
Net Earnings per Hog	$2.66	$3.70

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.04

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Default	Wheat @ $132.90/mt	Difference
Market Hogs	2,063,89	2,063,89	$0.0
Weaners/weanlings			$0.0
Cull Sows	49,57	49,575	$0.0
Cull Boars	420	420	$0.0
Manure Sales	10,660	10,660	$0.0
			$0.0
Total Revenues	2,124,554	2,124,554	$0.0

Capital Asset Values	Default	Wheat @ $132.90/mt	
Farrowing Facilities	1,766,885	1,766,885	$0.0
Nureserv Facilities	814,344	814,344	$0.0
Grower Facilities	925,048	925,048	$0.0
Finisher Facilities	1,252,930	1,252,930	$0.0
Sows	244,000	244,000	$0.0
Boars	13,800	13,800	$0.0
Total Value of Assets	5,017,006	5,017,006	$0.0

Size of Operations (Sows)	Default	Wheat @ $132.90/mt	
	5 Year Average Feed Cost		
Feed: Average Feed Costs			
Sow and Boar Diets	130,939	129,551	$0.10
Nursery Diets	198,861	196,440	$0.17
Grower Diets	159,421	155,109	$0.31
Finisher Diets	308,613	302,317	$0.45
Total Feed	797,834	783,417	$1.0
	57.23		

	Default	Wheat @ $132.90/mt	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.0
Replacement Boars	6,900	6,900	$0.0
Veterinary, Medicine & Supplies	34,855	34,855	$0.0
Maintenenace & Repairs	50,469	50,469	$0.0
Utilities	88,047	88,047	$0.0
Office Supplies	3,485	3,485	$0.0
Marketing & Transportation	69,709	69,709	$0.0
AI Supplies	6,274	6,274	$0.0
Barn Supplies	20,913	20,913	$0.0
Management and Consulting Fees	22,028	22,028	$0.0
Other Misc Costs	697	697	$0.0
Total Misc & Supplies	408,297	408,297	$0.0

Labour:	82,883	82,883	$0.0

Manure Handling	31,660	31,660	$0.0
Water Consumption	17,687	17,687	$0.0
Water and Manure Handling:	49,347	49,347	$0.0

Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.0
Interest and Deprec: Nursery	93,785	93,785	$0.0
Interest and Deprec: Grower	106,877	106,877	$0.0
Interest and Deprec: Finisher	144,548	144,548	$0.0
Management Salaries	94,723	94,723	$0.0
Insurance	53,594	53,594	$0.0
Property tax	16,033	16,033	$0.0
Total Fixed Costs	720,516	720,516	$0.0

	5 Year Average Feed Cost	
Size of Operations (Sows)	Default	Wheat @ $132.90/mt
Operating Interest	23,736	23,483
Total Operating	1,362,10	1,347,42
Total Costs	2,082,51	2,067,944
		5 Year Average Feed Cost
Gross Margin	762,454	777,12
Net Earnings	41,937	56,61
EBITDA	614,13	628,80
ROA	0.84%	1.13%
EBITDA/Sales	28.91%	29.60%
Net Earnings per hog	$2.2	$4.2

Hog pool price/ckg	$140.0	$140.0

Difference $1.

Effect of Gender and Crowding on Variation in Days to Market

Dana R. Cooper *M.Sc.*, John F. Patience *Ph.D.*, Harold W. Gonyou *Ph.D.* and Ruurd T. Zijlstra *Ph.D.*

Summary

Marketing strategies are affected by variation in days to market within groups of pigs. This study determined effects of gender and crowding on variation in body weight (BW) gain and days to market. Pigs were marketed individually at an identical market weight resulting in uniform carcass characteristics. Crowding did not increase variation; however, pigs marketed first were the heaviest pigs when traced back to farrowing. Thus, raising the growth curve of all pigs may be more practical than reducing variation. The latter appears very difficult on most farms.

Introduction

Managing variation in the production chain is receiving increasing attention. The economic impact of variation when marketing groups of pigs is enormous, yet few research programs focus on this issue. Uniformity of pigs reaching market weight may be affected by variation in growth caused by gender or crowding during the entire grower-finisher phase.

Experimental Procedures

At weaning, 493 pigs were assigned randomly within gender to a pen containing either 16 pigs/pen (0.35 m^2/pig; Control) or 21 pigs/pen (0.26 m^2/pig; Crowded). In the grow-finish room, pigs were allowed 0.88 m^2/pig (Control) or 0.67 m^2/pig (Crowded). Pigs were weighed at birth, days 21, 56, 77, 112, and 140 of age, and at market (~ 115 kg).

Results and Discussion

Crowding did not affect BW until day 77 when Control pigs were 1.6 kg heavier than Crowded pigs (Table 1). Gender did not affect BW until day 56 when barrows were 2.7 kg heavier than gilts. Coefficient of variation (CV) for BW at day 140 or days to market was not affected by gender or crowding. Together, results indicate that crowding reduced mean BW gain, but not variation around the mean. Marketing individual pigs at a specific BW resulted in similar carcasses between Control and Crowded pigs (Table 1). Overall, for an extra kg BW at weaning, 1.9 kg extra was gained at day 56 (8 wk), 2.4 kg extra at day 77 (10 wk), and 4.2 kg extra at day 140 (20 wk; Figure 1), indicating the importance of increasing weaning weight.

Implications

Marketing strategies should be developed based on variation within groups of pigs. Holding gilts longer than barrows may improve market value of a group. Less crowding reduced days to market (115 kg) by four days. Barrows reached market weight six days earlier than gilts.

Acknowledgements

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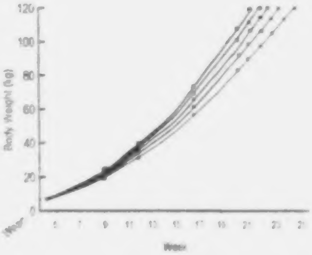

Figure 1. Growth curves of pigs marketed at 21, 22, 23, 24, and 25 weeks of age.

Table 1. Effect of gender and crowding on performance variables

	Barrows		Gilts	
Item	Control	Crowded	Control	Crowded
BW, kg				
day 0	1.5	1.5	1.4	1.4
day 21	5.4	5.3	5.3	5.3
day 56	19.9	18.7	19.7	19.3
day 77[b]	30.6	28.9	30.7	29.2
day 112[ab]	61.0	60.4	59.1	56.9
day 140[ab]	96.4	93.1	90.9	89.2
CV	8.0	8.9	10.8	9.3
Days to market[a]	156.9	160.1	161.0	165.1
CV	5.1	5.0	12.5	4.8
Carcass characteristics				
Dressing %	90.4	89.9	91.0	90.6
Fat, mm[a]	23.7	21.8	18.0	18.7
Lean, mm[a]	52.3	52.5	58.0	56.8
Index[a]	107.4	108.3	113.4	112.9

[a]Gender effect [b]Crowding effect

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	0.35 square meters	0.26 square meters	Difference
Market Hogs	2,063,899	2,007,603	-$4.04
Weaners/weanings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,068,258**	-$4.04

Capital Asset Values:	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	184,394	177,326	$0.51
Finisher Diets	309,485	300,367	$0.65
Total Feed	823,679	796,123	$1.98
	59.08		

	0.35 square meters	0.26 square meters	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**482,883**	**482,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	0.35 square meters	0.26 square meters
Operating Interest	24,197	23,708
Total Operating	1,388,403	1,360,358
Total Costs	2,108,920	2,080,874
	5 Year Average Feed Cost	
Gross Margin	736,150	707,900
Net Earnings	15,634	(12,616)
EBITDA	587,833	559,583
ROA	0.31%	-0.25%
EBITDA/Sales	27.67%	27.06%
Net Earnings per Hog	$1.12	($0.90)

Hog pool price/ckg	$140.00	$140.00
Difference		($2.03)

ENTERPRISE RETURNS MODULE (Phas)

Revenues	0.35 square meters	0.26 square meters	Difference
Market Hogs	2,063,899	2,007,603	-$4.06
Weaners/weaning:			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,068,258	-$4.06

Capital Asset Values	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilites	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	184,394	177,326	$0.51
Finisher Diets	309,485	300,367	$0.65
Total Feed	823,679	796,123	$1.99
	59.08		

	0.35 square meters	0.26 square meters	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	0.35 square meters	0.26 square meters
Operating Interest	24,197	23,708
Total Operating	1,388,404	1,360,358
Total Costs	2,108,920	2,080,874
	5 Year Average Feed Cost	
Gross Margin	736,150	707,900
Net Earnings	15,634	(12,616)
EBITDA	587,833	559,583
ROA	0.31%	-0.25%
EBITDA/Sales	27.67%	27.06%
Net Earnings per hog	$1.13	($0.91)

Hog pool price/ckg	$140.00	$140.00

Difference ($2.04)

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues	0.35 square meters	0.26 square meters	Difference
Market Hogs	2,063,899	2,006,559	-$4.11
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,067,214**	-$4.11

Capital Asset Values	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	170,889	164,459	$0.46
Finisher Diets	306,776	297,851	$0.64
Total Feed	807,465	780,741	$1.92
	57.92		

	0.35 square meters	0.26 square meters	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**382,883**	**382,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	0.35 square meters	0.26 square meters
Operating Interest	23,909	23,435
Total Operating	1,371,902	1,344,704
Total Costs	2,092,418	2,065,220
	5 Year Average Feed Cost	
Gross Margin	752,652	722,510
Net Earnings	32,136	1,994
EBITDA	604,335	574,193
ROA	0.64%	0.04%
EBITDA/Sales	28.45%	27.78%
Net Earnings per Hog	$2.30	$0.14

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.16)

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	0.35 square meters	0.26 square meters\	Difference
Market Hogs	2,063,899	2,005,666	-$4.18
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,066,321**	-$4.18

Capital Asset Values:	0.35 square meters	0.26 square meters\	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	0.35 square meters	0.26 square meters\	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	166,763	160,210	$0.47
Finisher Diets	306,051	297,269	$0.63
Total Feed	802,614	775,909	$1.92
	57.57		

	0.35 square meters	0.26 square meters\	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	0.35 square meters	0.26 square meters\
Operating Interest	23,823	23,349
Total Operating	1,366,964	1,339,785
Total Costs	2,087,481	2,060,302
	5 Year Average Feed Cost	
Gross Margin	757,589	726,535
Net Earnings	37,073	6,019
EBITDA	609,272	578,218
ROA	0.74%	0.12%
EBITDA/Sales	28.68%	27.98%
Net Earnings per Hog	$2.66	$0.43

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.23)

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues	0.35 square meters	0.26 square meters	Difference
Market hogs	2,063,899	2,006,559	-$4.11
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,067,214	-$4.11

Capital Asset Values	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	170,889	164,459	$0.46
Finisher Diets	306,776	297,851	$0.64
Total Feed	807,465	780,741	$1.92
	57.92		

	0.35 square meters	0.26 square meters	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	0.35 square meters	0.26 square meters
Operating Interest	23,909	23,435
Total Operating	1,371,902	1,344,704
Total Costs	2,092,418	2,065,220
	5 Year Average Feed Cost	
Gross Margin	752,652	722,510
Net Earnings	32,136	1,994
EBITDA	604,335	574,155
ROA	0.64%	0.04%
EBITDA/Sale	28.45%	27.78%
Net Earnings per Hog	$2.30	$0.14

Hog pool price/ckg	$140.00	$140.00

Difference: [illegible]

ENTERPRISE RETURNS MODULE (Phas)

Revenues	0.35 square meters	0.26 square meters	Difference
Market Hogs	2,063,899	2,005,666	-$4.18
Weaners (weaning)			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,066,321	-$4.18

Capital Asset Values	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	166,762	160,210	$0.47
Finisher Diets	306,051	297,269	$0.63
Total Feed	802,614	775,909	$1.92
	57.57		

	0.35 square meters	0.26 square meters	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	0.35 square meters	0.26 square meters
Operating Interest	23,823	23,349
Total Operating	1,366,964	1,339,785
Total Costs	2,087,481	2,060,300
	5 Year Average Feed Cost	
Gross Margin	757,585	726,535
Net Earnings	37,073	6,019
EBITDA	609,27	578,218
ROA	0.74%	0.12%
EBITDA/Sales	28.68%	27.98%
Net Earnings per Hog	$2.66	$0.43

Hog pool price/ckg	$140.00	$140.00

Difference ($2.23

ENTERPRISE RETURNS MODULE (Phas)

Revenues	0.35 square meters	0.26 square meters	Difference
Market Hogs	2,063,899	2,006,630	-$4.11
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,067,285	-$4.11
Capital Asset Values	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	159,421	153,608	$0.42
Finisher Diets	308,613	299,441	$0.66
Total Feed	797,834	771,480	$1.89
	57.23		
	0.35 square meters	0.26 square meters	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows	0.35 square meters	0.26 square meters
Operating Interest	23,738	23,271
Total Operating	1,362,100	1,335,278
Total Costs	2,082,616	2,055,794
		5 Year Average Feed Cost
Gross Margin	762,454	732,007
Net Earnings	41,937	11,490
EBITDA	614,137	583,689
ROA	0.84%	0.23%
EBITDA/Sales	28.91%	28.23%
Net Earnings per Hog	$3.0	$2.8

Hog pool price/ckg	$140.00	$140.00

Difference ($2.1

ENTERPRISE RETURNS MODULE (Phas)

Revenues	0.35 square meters	0.26 square meters	Difference
Market Hogs	2,063,899	2,006,630	-$4.11
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,067,285**	-$4.11
Capital Asset Values	0.35 square meters	0.26 square meters	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	0.35 square meters	0.26 square meters	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	187,491	$0.82
Grower Diets	159,421	153,608	$0.42
Finisher Diets	308,613	299,441	$0.66
Total Feed	797,834	771,480	$1.89
	57.23		
	0.35 square meters	0.26 square meters	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	0.35 square meters	0.26 square meters
Operating Interest	23,738	23,271
Total Operating	1,362,100	1,335,278
Total Costs	2,082,616	2,055,794
	5 Year Average Feed Cost	
Gross Margin	762,454	732,007
Net Earnings	41,937	11,490
EBITDA	614,137	583,689
ROA	0.84%	0.23%
EBITDA/Sales	28.91%	28.23%
Net Earnings per Hog	$3.01	$0.82

Hog pool price/ckg	$140.00	$140.00

Difference ($2.18)

The Effect of Ergot on the Performance of Weanling Pigs

T.F. Oresanya[1] *M.Sc.*, J.F. Patience *Ph.D.*, R.T. Zijlstra *Ph.D.*, A.D. Beaulieu *Ph.D.*, D.M. Middleton[2] *Ph.D.*, B.R. Blakley[3] *Ph.D.*, and D.A. Gillis *M.Sc.*

Summary

Ergot contains numerous poisonous substances (alkaloids), which upon ingestion by animals may lead to poor growth rate, decreased feed consumption and poor feed efficiency. The effect will depend on the age or physiological stage of the animal, and the amount consumed. Results obtained in this study indicate that the consumption of diets containing more than 0.10% high alkaloid ergot by weanling pigs severely reduces growth rate, and feed consumption and efficiency.

Introduction

Ergot infection in cereal grains, especially wheat, is of great economic importance. An ergot infection may not result in reduced grain yield but will reduce quality due to the replacement of grain kernels with a number of poisonous alkaloid-containing ergot sclerotia. These grains may end up as feedstuff in swine diets. Ergot ingestion may impair growth and development. Also, the plasma concentration of certain hormones, especially prolactin, may be reduced. Information is lacking on the safe inclusion level of ergot in the diet of the weanling pig. This experiment was conducted to investigate the impact on performance of including ergot-contaminated wheat in the diet of weaned pigs and determine the level that can safely be included in the diet.

Experimental Procedures

Ground ergot sclerotia were added to diets at 0% (control), 0.05%, 0.10%, 0.25%, 0.50%, and 1.00% (weight basis). Ground wheat ergot sclerotia contained 1880 mg alkaloid/kg with ergocristine, ergotamine, ergosine, ergocryptine and ergocornine constituting 40, 36, 11, 7, and 6%,

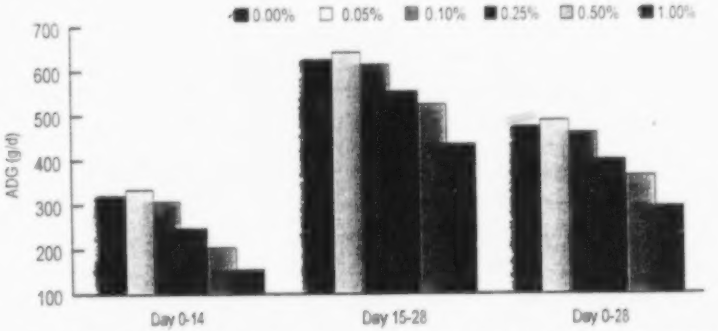

Figure 1 **The effect of level of dietary ergot on ADG of piglets (P < 0.001, all periods).**

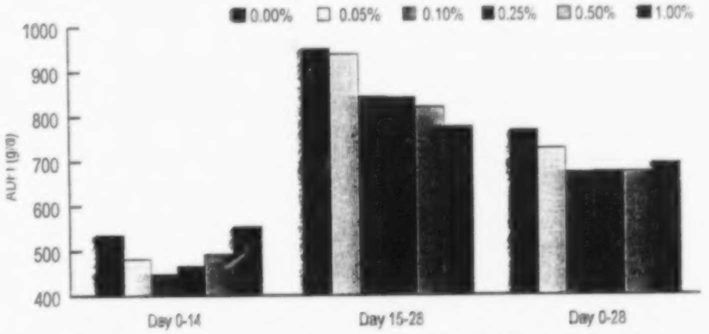

Figure 2 **The effect of level of dietary ergot on ADFI of piglets (P > 0.05, d 0-14; P < 0.05, d 15-28 and d 0-28).**

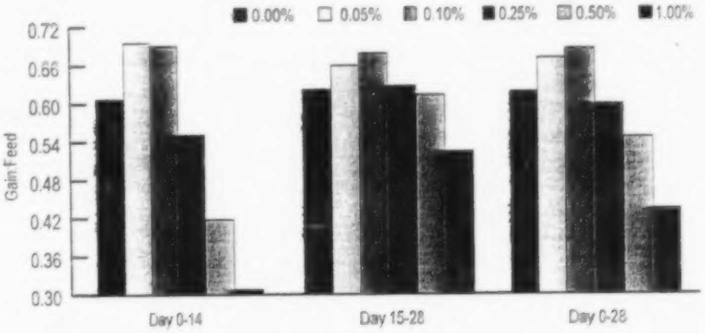

Figure 3 **The effect of level of dietary ergot on feed efficiency of piglets (P < 0.01, all periods).**

[1] PSCI and Department of Animal and Poultry Science, University of Saskatchewan

[2] Department of Vet. Pathology, University of Saskatchewan

[3] Department of Vet. Biomedical Sciences and the Toxicology Centre, University of Saskatchewan

respectively. Thus, diets contained 0.00, 1.04, 2.07, 5.21, 10.41, and 20.82 mg alkaloid/kg, respectively. Each diet was fed to 8 pens of four pigs (two barrows and two gilts) for four weeks. Average daily gain and feed efficiency were calculated from the performance data. Prolactin analysis was conducted on serum samples collected from pigs on day 28. Regression analysis was used to determine the effect of ergot level on performance and serum prolactin concentration.

Diets containing up to 0.10% ergot can safely be fed to weanling pigs, provided these pigs are not destined for the breeding herd.

Results and Discussion

Nervous signs or cutaneous lesions associated with ergotoxicity were not observed. Average daily gain was similar for pigs that consumed diets up to 0.10% ergot, but was depressed at higher levels ($P < 0.001$) (Figure 1). The effects were most pronounced in weeks 1 and 2 with pigs fed the 1.00% ergot gaining 82 and 38% less than control (211 vs. 39 g/d, and 432 vs. 269 g/d, week 1 and 2, respectively (Figure 1). Average daily feed intake was decreased over the entire period ($P < 0.05$) but was unaffected by ergot during weeks 1 and 2 ($P > 0.20$) (Figure 2). Feed efficiency (gain:feed ratio) was increased at low levels of ergot inclusion but was reduced with ergot levels above 0.10% (0.685 vs. 0.435, 0.10% vs. 1.00%). Serum prolactin concentration was reduced at all levels of ergot ($P < 0.0001$) (Figure 4). The maximum level of alkaloids that can be included in weanling pig diets without adverse effects on ADG and feed efficiency was 2.31 mg alkaloid/kg. This is based on the alkaloid content and profile of ergot sclerotia used in this study and corresponds to 0.12 g ergot sclerotia per 100 g diet.

Implications

Feeding high levels of ergot alkaloid caused severe reductions in the growth performance of weanling pigs. Prolonged exposure depressed feed intake. Serum prolactin concentration was depressed which indicates that ergot may impair normal mammary gland development in gilts. When the level of ergot in wheat is known, the level that can be used in weanling pig diet can be calculated. For example, wheat contaminated with 1.0% ergot, should not comprise more than 10% of the diet of weanling pigs.

Acknowledgements

Strategic program funding provided by Sask Pork, Alberta Pork, the Manitoba Pork Council, and the Saskatchewan Agriculture and Food Development Fund. Direct funding from the Alberta Agricultural Research Institute (AARI).

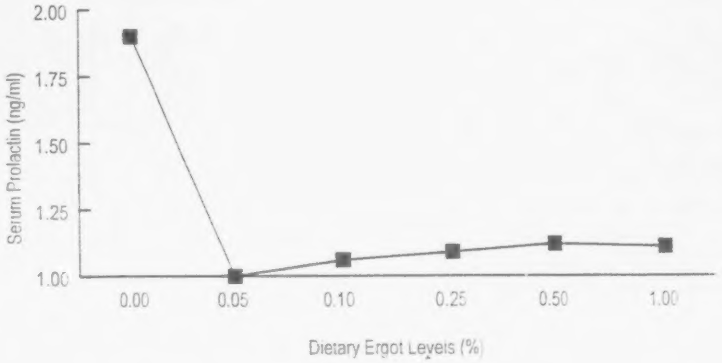

Figure 4 **The effect of level of dietary ergot on serum prolactin concentration of piglets ($P < 0.0001$).**

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	No Ergot	0.25% Ergot	Difference
Market Hogs	2,063,899	1,929,808	-$9.62
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	1,990,463	-$9.62

Capital Asset Values:	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	163,923	$2.51
Grower Diets	184,394	175,175	$0.66
Finisher Diets	309,485	294,011	$1.11
Total Feed	823,679	764,048	$4.28
	59.08		

	No Ergot	0.25% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	382,883	382,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	No Ergot	0.25% Ergot
Operating Interest	24,197	23,139
Total Operating	1,388,403	1,327,714
Total Costs	2,108,920	2,048,231
	5 Year Average Feed Cost	
Gross Margin	736,150	662,749
Net Earnings	15,634	(57,768)
EBITDA	587,833	514,432
ROA	0.31%	-1.15%
EBITDA/Sales	27.67%	25.84%
Net Earnings per Hog	$1.12	($4.14)
Hog pool price/ckg	$140.00	$140.00

Difference ($5.26)

ENTERPRISE RETURNS MODULE (Phas)

Revenues	No Ergot	0.25% Ergot	Difference
Market Hogs	2,063,899	1,929,808	-$9.62
Weaners/weaning			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	1,990,463	-$9.62

Capital Asset Values:	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	163,923	$2.51
Grower Diets	184,394	175,175	$0.66
Finisher Diets	309,485	294,011	$1.11
Total Feed	823,679	764,048	$4.28
	59.08		

	No Ergot	0.25% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	No Ergot	0.25% Ergot
Operating Interest	24,197	23,139
Total Operating	1,388,403	1,327,714
Total Costs	2,108,920	2,048,231
	5 Year Average Feed Cost	
Gross Margin	736,150	662,749
Net Earnings	15,634	(57,768)
EBITDA	587,833	514,432
ROA	0.31%	-1.15%
EBITDA/Sales	27.67%	25.84%
Net Earnings per Hog	$1.11	($4.14)

Hog pool price/ckg	$140.00	$140.00

Difference ($5.26)

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues	No Ergot	0.25% Ergot	Difference
Market Hogs	2,063,899	1,929,812	-$9.62
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**1,990,467**	-$9.62
Capital Asset Values	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	163,923	$2.51
Grower Diets	170,889	162,345	$0.61
Finisher Diets	306,776	291,437	$1.10
Total Feed	807,465	748,644	$4.22
	57.92		
	No Ergot	0.25% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	No Ergot	0.25% Ergot
Operating Interest	23,909	22,866
Total Operating	1,371,902	1,312,037
Total Costs	2,092,418	2,032,554
	5 Year Average Feed Cost	
Gross Margin	752,652	678,430
Net Earnings	32,136	(42,087)
EBITDA	604,335	530,112
ROA	0.64%	-0.84%
EBITDA/Sales	28.45%	26.63%
Net Earnings per Hog	$2.30	($3.02)

Hog pool price/ckg	$140.00	$140.00
	Difference	($5.3237)

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	No Ergot	0.25% Ergot	Difference
Market Hogs	2,063,899	1,929,808	-$9.62
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**1,990,463**	-$9.62
Capital Asset Values:	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	163,923	$2.51
Grower Diets	166,763	158,425	$0.60
Finisher Diets	306,051	290,749	$1.10
Total Feed	802,614	744,036	$4.20
	57.57		
	No Ergot	0.25% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	No Ergot	0.25% Ergot
Operating Interest	23,823	22,784
Total Operating	1,366,964	1,307,347
Total Costs	2,087,481	2,027,864
	5 Year Average Feed Cost	
Gross Margin	757,589	683,116
Net Earnings	37,073	(37,401)
EBITDA	609,272	534,799
ROA	0.74%	-0.75%
EBITDA/Sales	28.68%	26.87%
Net Earnings per Hog	$2.66	($2.68)

Hog pool price/ckg	$140.00	$140.00
	Difference	($5.34)

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues	No Ergot	0.25% Ergot	Difference
Market Hog	2,063,899	1,929,812	-$9.62
Weaners/weanling			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	1,990,467	-$9.62
Capital Asset Values	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nurserv Diets	198,861	163,923	$2.51
Grower Diets	170,889	162,345	$0.61
Finisher Diets	306,776	291,437	$1.10
Total Feed	807,465	748,644	$4.22
	57.92		
	No Ergot	0.25% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	No Ergot	0.25% Ergot
Operating Interest	23,904	22,866
Total Operating	1,371,902	1,312,037
Total Costs	2,092,418	2,032,554
	5 Year Average Feed Cost	
Gross Margin	752,652	678,430
Net Earnings	32,136	(42,087)
EBITDA	604,335	530,113
ROA	0.64%	-0.84%
EBITDA/Sales	28.45%	26.63%
Net Earnings per Hog	$2.30	($3.02)

Hog pool price/ckg	$140.00	$140.00

Difference ($5.3237)

ENTERPRISE RETURNS MODULE (Phas)

Revenues	No Ergot	0.25% Ergot	Difference
Market Hogs	2,063,894	1,929,808	-$9.6
Weaners/weanlings			$0.0
Cull Sows	49,575	49,575	$0.0
Cull Boars	420	420	$0.0
Manure Sales	10,660	10,660	$0.0
			$0.0
Total Revenues	2,124,554	1,990,463	-$9.6

Capital Asset Values	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	163,923	$2.5
Grower Diets	166,763	158,425	$0.60
Finisher Diets	306,051	290,749	$1.10
Total Feed	802,614	744,036	$4.2
	57.57		

	No Ergot	0.25% Ergot	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	No Ergot	0.25% Ergot
Operating Interest	23,823	22,784
Total Operating	1,366,964	1,307,347
Total Costs	2,087,481	2,027,864
	5 Year Average Feed Cost	
Gross Margin	757,589	683,116
Net Earnings	37,073	(37,401)
EBITDA	609,272	534,799
ROA	0.74%	-0.75%
EBITDA/Sales	28.68%	26.87%
Net Earnings per Hog	$2.6	($2.68)

Hog pool price/ckg	$140.00	$140.00

Difference ($5.34)

ENTERPRISE RETURNS MODULE (Phas)

Revenues	No Ergot	0.25% Ergot	Difference
Market Hogs	2,063,899	1,929,808	-$9.6
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	1,990,463	-$9.6
Capital Asset Values	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	163,923	$2.51
Grower Diets	159,421	151,450	$0.57
Finisher Diets	308,613	293,182	$1.11
Total Feed	797,834	739,495	$4.18
	57.23		
	No Ergot	0.25% Ergot	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	No Ergot	0.25% Ergot
Operating Interest	23,738	22,704
Total Operating	1,362,105	1,302,726
Total Costs	2,082,616	2,023,242
	5 Year Average Feed Cost	
Gross Margin	762,454	687,737
Net Earnings	41,937	(32,779)
EBITDA	614,137	539,420
ROA	0.84%	-0.65%
EBITDA/Sales	28.91%	27.10%
Net Earnings per Hog	$2.01	[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference ($5.36)

ENTERPRISE RETURNS MODULE (Phas)

Revenues	No Ergot	0.25% Ergot	Difference
Market Hogs	2.063.899	1,929,808	-$9.62
Weaners/weanlings			$0.00
Cull Sows	49.575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**1,990,463**	-$9.62

Capital Asset Values:	No Ergot	0.25% Ergot	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	No Ergot	0.25% Ergot	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	163,923	$2.51
Grower Diets	159,421	151,450	$0.57
Finisher Diets	308,613	293,182	$1.11
Total Feed	797,834	739,495	$4.18
	57.23		

	No Ergot	0.25% Ergot	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**182,883**	**182,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	No Ergot	0.25% Ergot
Operating Interest	23,738	22,704
Total Operating	1.362.100	1,302,726
Total Costs	2,082,616	2,023,242
	5 Year Average Feed Cost	
Gross Margin	762,454	687,737
Net Earnings	41,937	(32,779)
EBITDA	614,137	539,420
ROA	0.84%	-0.65%
EBITDA/Sales	28.91%	27.10%
Net Earnings per Hog	$3.01	($2.35)

Hog pool price/ckg	$140.00	$140.00
	Difference	($5.36)

EFFECT OF FEED PRESENTATION ON THE FEEDING BEHAVIOUR OF GROWER/FINISHER PIGS

Kimberly A.M. MacDonald, and Harold W. Gonyou

Introduction

Recent research suggests the once standard five pigs per feeder space underestimates the actual carrying capacity of most modern feeder designs. The maximum number of pigs that can be fed from a single feeder space should be highly correlated with the eating speed of the animals. The feeding behaviour of pigs is influenced by many factors such as, but not limited to, competition, feed type (pellet vs. mash), presentation (dry vs. wet/dry or liquid feeding systems) and pig size. In this study, we examined the effect of feed type and presentation on the eating behaviour of grower/finisher pigs. Furthermore, we attempted to determine if these effects would then translate into higher stocking densities of the feeder (based on percentage of capacity of the feeder).

Methods

Experiment One. Pigs were randomly assigned to each of four treatments: dry mash (DM), wet/dry mash (WM), dry pellets (DP) and wet/dry pellets (WP), fed from a single space feeder. Each pen contained six barrows and six gilts, and the average weight in each pen was similar. Feed was weighed as it was added to the feeder; pigs and any remaining feed were weighed every two weeks. When the pigs were small (35-45 kg), the pens were videotaped for two consecutive 24-hour periods in order to determine total duration of eating. Video recordings and analysis were repeated when the pigs were large (90-100kg) to determine the effects of size on time spent eating and if this effect was consistent across the treatments.

Experiment Two. Using data from experiment one, an estimate of the number of pigs required to create various levels of feeder space utilization (stocking density) under each previously outlined feeding condition was calculated. Grower pig numbers were based on small data, while finisher phase numbers were calculated using large pig data. Stocking densities examined were standard (12 pigs/pen), 95, 110 and 125% of feeder capacity in the grower phase and 80, 102.5 and 125% of capacity in the finisher phase. Pigs stayed in the grower phase for six weeks before being randomly reassigned to the finisher phase treatments, where they stayed for four weeks. Video recordings were taken when the pigs were 35-45kg in grower and during the third week of finisher. Feed was weighed as it was added to the feeders, and pigs were weighed regularly.

Results

Experiment One. Pigs fed a DM diet spent significantly more time at the feeder than those fed WM, DP or WP (refer to table 1). There was no significant difference in total duration of eating among WM, DP and WP fed pigs. ADFI was similar among treatment groups. However, ADG was lower in DM fed pigs as compared to WM or WP treatments. DP pigs had intermediate gains (see table 1). Large pigs spent less time at the feeder than small pigs.

> *Pigs on a dry mash diet spent more time at the feeder than those on other diets.*

Experiment Two. Comparisons between groups of similar size (12 pigs in grower and 18 pigs in finisher) revealed results similar to those found in experiment one. In the grower phase, DM pigs spent more time at the feeder than DP, WM and WP fed pigs (98.3 vs. 87.6 vs. 61.2 vs. 80.0 min/pig/day). Also, DM pigs gained less than WM, DP or WP fed pigs (748 vs. 833 vs. 799 vs. 792 g/day). Pigs fed a WM diet had higher ADFI, while no significant differences were found in ADFI among DM, DP and WP fed pigs (2.15 vs. 1.91 vs. 1.86 vs. 1.88 kg/pig/day). Similar trends were apparent in the finisher phase (see Table 2).

As stocking density increased, time spent eating per pig decreased in both grower and finisher phases, regardless of feed type or presentation. Likewise, ADG and ADFI had a tendency to decrease as stocking density increased, particularly in treatments that exceeded 100% of capacity. However, the point at which production values significantly decreased varied based on feed type and presentation.

Conclusions

Feed type (mash vs. pellets) and presentation (dry vs. wet/dry) have major affects on swine eating behaviour and, in turn, can influence productivity. Pigs fed dry mash diets spend more time eating, however this effect can be counteracted by the addition of water, such as in a wet/dry feeding system. This same effect does not appear to apply to wet/dry versus dry pellets, which could be due to a variety of factors, such as palatability or simple mechanics. These results are noticeable in both grower and finisher phases, suggesting that the disadvantages and advantages associated with feed type and presentation are persistent, even with the increased eating speed of larger animals.

Stocking density (based on percentage of capacity) of the feeder also has a strong influence on time spent eating per pig, ADFI and ADG. As stocking density increased there was a general trend for ADG and ADFI to fall, regardless of feed type and presentation (see figure 1 for an example). In the grower phase, the maximum number of pigs that could be fed from a single feeder space without a significant decrease in ADG and ADFI was 15, 19, 20 and 21 for DM, WM, WP and DP feed respectively. While in the finisher phase, 14, 18 and 23 pigs could be fed DM, WM and DP respectively, from a single feeder space. There was no intermediate group size for WP fed pigs in the finisher phase, but at least 18 pigs can be fed from a single feeder space and maintain good ADG and ADFI.

Maximum stocking density depends on feed type and presentation.

Acknowledgments

Strategic program funding provided by Sask Pork, Manitoba Pork and Saskatchewan Agriculture and Food Development Fund. Additional funding for this research was made available by the Alberta Agriculture Research Institute and the Alberta Pork Producer Council.

Table 1. Overall effect of feed type and presentation on ADG, ADFI and Total Duration of Eating (Experiment One)

Feed Type	Presentation	ADG (kg)	SEM	ADFI (kg)	SEM	Total Duration of Eating (min/pig/day)	SEM
Mash	Dry	0.792^{a}	0.023	2.50	0.145	106.10^{a}	2.91
Mash	Wet/Dry	0.903^{b}	0.026	2.38	0.145	68.04^{b}	2.91
Pellet	Dry	0.868^{b}	0.021	2.48	0.145	58.79^{b}	2.91
Pellet	Wet/Dry	0.899^{b}	0.025	2.37	0.205	59.70^{b}	2.91

^{ab} ; p <0.05

Table 2. Overall effect of feed type and presentation on ADG, ADFI and Total Duration of Eating - Finisher Phase (Group size = 18 pigs) (Experiment Two)

Feed Type	Presentation	ADG (kg)	SEM	ADFI (kg)	SEM	Total Duration of Eating (min/pig/day)	SEM
Mash	Dry	0.739^{b}	0.046	2.31^{b}	0.139	78.6^{a}	12.35
Mash	Wet/Dry	0.955^{a}	0.046	2.93^{a}	0.139	69.7^{b}	12.35
Pellet	Dry	0.867^{b}	0.045	2.51^{a,b}	0.139	68.9^{b}	12.35
Pellet	Wet/Dry	1.02^{a}	0.044	2.71^{a,b}	0.139	65.5^{b}	12.35

Numbers with different superscripts have $p<0.05$

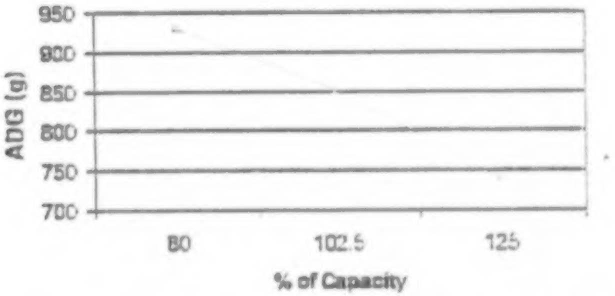

Figure 1. Effect of stocking density on ADG of DM fed pigs in the Finisher Phase

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wet/Dry mash	Dry Mash	Difference
Market Hogs	2,063,899	1,986,518	-$5.55
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,047,173	-$5.55

Capital Asset Values	Wet/Dry mash	Dry Mash	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wet/Dry mash	Dry Mash	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	184,394	184,394	$0.00
Finisher Diets	309,485	271,442	$2.73
Total Feed	823,679	785,636	$2.73
	59.08		
	Wet/Dry mash	Dry Mash	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc. Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Wet/Dry mash	Dry Mash
Operating Interest	24,197	23,522
Total Operating	1,388,403	1,349,685
Total Costs	2,108,920	2,070,202
	5 Year Average Feed Cost	
Gross Margin	736,150	697,487
Net Earnings	15,634	(23,029)
EBITDA	587,833	549,170
ROA	0.31%	-0.46%
EBITDA/Sales	27.67%	26.83%
Net Earnings per hog	$1.12	($1.65)

Hog pool price/ckg	$140.00	$140.00
Difference		($2.77)

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Wet/Dry mash	Dry Mash	Difference
Market Hogs	2,063,899	1,986,518	-$5.59
Weaners/weanlings			$0.00
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			$0.00
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Capital Asset Values	Wet/Dry mash	Dry Mash	
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Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Wet/Dry mash	Dry Mash	
Feed: Average Feed Costs	5 Year Average Feed Cost		
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Nursery Diets	198,861	198,861	$0.00
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Total Feed	823,679	785,636	$2.73
	59.08		
	Wet/Dry mash	Dry Mash	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
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Management and Consulting Fees	22,028	22,028	$0.00
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Total Misc & Supplies	408,297	408,297	$0.00
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Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wet/Dry mash	Dry Mash
Operating Interest	24,197	23,522
Total Operating	1,388,403	1,349,685
Total Costs	2,108,920	2,070,202
		5 Year Average Feed Cost
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Net Earnings	15,634	(23,029)
EBITDA	587,833	549,170
ROA	0.31%	-0.46%
EBITDA/Sales	27.67%	26.83%
Net Earnings per hog	$1.12	($1.65)

Hog pool price/ckg	$140.00	$140.00

Difference ($2.77)

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues:	Wet/Dry mash	Dry Mash	Difference
Market Hogs	2,063,899	1,986,528	-$5.55
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,047,183**	-$5.55
Capital Asset Values:	Wet/Dry mash	Dry Mash	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	Wet/Dry mash	Dry Mash	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	269,066	$2.70
Total Feed	807,465	769,755	$2.70
	57.92		
	Wet/Dry mash	Dry Mash	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wet/Dry mash	Dry Mash
Operating Interest	23,909	23,240
Total Operating	1,371,902	1,333,523
Total Costs	2,092,418	2,054,039
	5 Year Average Feed Cost	
Gross Margin	752,652	713,660
Net Earnings	32,136	(6,856)
EBITDA	604,335	565,343
ROA	0.64%	-0.14%
EBITDA/Sales	28.45%	27.62%
Net Earnings per Hog	$2.30	($0.49)

Hog pool price/ckg	$140.00	$140.00

Difference ($2.80)

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wet/Dry Mash	Dry Mash	Difference
Market Hogs	2,063,899	1,986,461	-$5.55
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,047,115**	-$5.55
Capital Asset Values:	Wet/Dry Mash	Dry Mash	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	Wet/Dry Mash	Dry Mash	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	166,763	166,763	$0.00
Finisher Diets	306,051	268,430	$2.70
Total Feed	802,614	764,993	$2.70
	57.57		
	Wet/Dry Mash	Dry Mash	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wet/Dry Mash	Dry Mash
Operating Interest	23,823	23,156
Total Operating	1,366,964	1,328,676
Total Costs	2,087,481	2,049,193
-	5 Year Average Feed Cost	
Gross Margin	757,589	718,439
Net Earnings	37,073	(2,077)
EBITDA	609,272	570,122
ROA	0.74%	-0.04%
EBITDA/Sales	28.68%	27.85%
Net Earnings per Hog	$2.66	($0.15)

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.81)

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues:	Wet/Dry mash	Dry Mash	Difference
Market Hogs	2,063,899	1,986,528	-$5.59
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,047,183	-$5.59
Capital Asset Values:	Wet/Dry mash	Dry Mash	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nureserv Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Wet/Dry mash	Dry Mash	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	269,066	$2.70
Total Feed	807,465	769,755	$2.70
	57.92		
	Wet/Dry mash	Dry Mash	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Wet/Dry mash	Dry Mash
Operating Interest	23,909	23,240
Total Operating	1,371,902	1,333,523
Total Costs	2,092,418	2,054,039
	5 Year Average Feed Cost	
Gross Margin	752,652	713,660
Net Earnings	32,136	16,856
EBITDA	604,335	565,343
ROA	0.64%	-0.14%
EBITDA/Sales	28.45%	27.62%
Net Earnings per Hog	$2.30	$0.43

Hog pool price/ckg	$140.00	$140.00

Difference: $2.8[illegible]

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Wet/Dry Mash	Dry Mash	Difference
Market Hogs	2,063,899	1,986,461	-$5.55
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,047,115	-$5.55

Capital Asset Values:	Wet/Dry Mash	Dry Mash	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wet/Dry Mash	Dry Mash	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	166,763	166,763	$0.00
Finisher Diets	306,051	268,430	$2.70
Total Feed	802,614	764,993	$2.70
	57.57		

	Wet/Dry Mash	Dry Mash	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wet/Dry Mash	Dry Mash
Operating Interest	23,823	23,156
Total Operating	1,366,964	1,328,676
Total Costs	2,087,481	2,049,193
	5 Year Average Feed Cost	
Gross Margin	757,589	718,439
Net Earnings	37,073	2,577
EBITDA	609,272	570,122
ROA	0.74%	-0.04%
EBITDA/Sales	28.68%	27.85%
Net Earnings per Hog	$2.66	($0.12)

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.81)

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wet/Dry Mash	Dry Mash	Difference
Market Hogs	2,063,899	1,984,428	-$5.70
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,045,083	-$5.70
Capital Asset Values:	Wet/Dry Mash	Dry Mash	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Wet/Dry Mash	Dry Mash	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	159,421	159,421	$0.00
Finisher Diets	308,613	270,677	$2.72
Total Feed	797,834	759,898	$2.72
	57.23		
	Wet/Dry Mash	Dry Mash	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wet/Dry Mash	Dry Mash
Operating Interest	23,738	23,066
Total Operating	1,362,100	1,323,491
Total Costs	2,082,616	2,044,007
	5 Year Average Feed Cost	
Gross Margin	762,454	721,592
Net Earnings	41,937	1,075
EBITDA	614,137	573,274
ROA	0.84%	0.02%
EBITDA/Sales	28.91%	28.03%
Net Earnings per Hog	$3.01	$0.08

Hog pool price/ckg	$140.00	$140.00

Difference ($2.93)

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wet/Dry Mash	Dry Mash	Difference
Market Hogs	2,063,899	1,984,428	-$5.70
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,045,083**	-$5.70
Capital Asset Values:	Wet/Dry Mash	Dry Mash	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	Wet/Dry Mash	Dry Mash	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	159,421	159,421	$0.00
Finisher Diets	308,613	270,677	$2.72
Total Feed	797,834	759,898	$2.72
	57.23		
	Wet/Dry Mash	Dry Mash	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
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Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
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Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Wet/Dry Mash	Dry Mash
Operating Interest	23,738	23,066
Total Operating	1,362,100	1,323,491
Total Costs	2,082,616	2,044,007
	5 Year Average Feed Cost	
Gross Margin	762,454	721,592
Net Earnings	41,937	1,075
EBITDA	614,137	573,274
ROA	0.84%	0.02%
EBITDA/Sales	28.91%	28.03%
Net Earnings per Hog	$3.01	$0.08

Hog pool price/ckg	$140.00	$140.00
	Difference	($2.93)

THE DE CONTENT OF HULL-LESS BARLEY

Ruurd T. Zijlstra, Dave D. Maenz[1]
John F. Patience

Summary

Hull-less barley is used as a source of energy and amino acids in swine rations in Western Canada but is characterized poorly in terms of DE content. Our objective was to determine the DE content of cleaned hull-less barley in relation to barley, wheat, and triticale. Chemical characteristics were analyzed to enable subsequent calculation of prediction equations.

The DE content of cleaned hull-less barley was equal to that of wheat. We were able to predict the DE content of hull-less barley accurately by using starch, neutral-detergent insoluble nitrogen (NDIN) and neutral-detergent fiber (NDF) analyses.

The DE content of clean hull-less barley is comparable to wheat.

Introduction

Hull-less barley is an increasingly important energy and amino acid source for grower-finisher pigs in Western Canada, but its nutritional value has been characterized poorly. The DE content has been determined in samples that were not cleaned properly or in samples of which hull content in the sample was not reported.

For this study, five varieties of hull-less barley were grown on two separate experimental fields in Saskatchewan. The objective was to relate DE content of hull-less barley to other cereal grains and with chemical characteristics to enable subsequent calculation of prediction equations.

Experimental Procedures

As a component of a collaborative project with the Prairie Feed Resource Centre, hull-less barley was cleaned and analyzed for crude protein (CP), acid-detergent fiber (ADF), NDF, ash, ether extract (EE), NDIN, starch, and DE content. Regression analysis was used to develop relations between DE content and chemical composition.

Results and Discussion

The DE content of cleaned hull-less barley was equal to that of wheat (Figure 1). The difference between the DE content of hull-less barley and barley was around 400 kcal/kg on a DM basis, suggesting that for each 25 per cent additional hulls in the sample the DE content of hull-less barley might be reduced by 100 kcal DE/kg DM. Using starch, NDIN, and NDF (all three on DM-basis), an accurate ($R^2 = 0.88$) prediction equation could be developed: $DE\ (kcal/\ kg\ DM) = 2231 + 22^{*}per\ cent\ starch + 636^{*}per\ cent\ NDIN - 42^{*}per\ cent\ NDF$. Equations using CP with ADF, NDF, CF, or EE did not results in accurate predictions of DE content.

Implications

Results indicate that the DE content of cleaned hull-less barley is equal to that of wheat. This also means that uncleaned hull-less barley will have a lesser value than wheat and that the amount of hulls remaining in the sample should be taken into consideration on a weight basis for diet formulation or price paid. The DE content of hull-less barley could be predicted accurately; however, the prediction will be expensive to perform.

Acknowledgements

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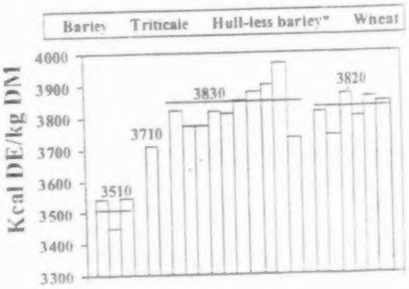

* Hull-less barley was cleaned to contain 0% hull.

Figure 1. The DE content of cleaned hull-less barley in contrast to wheat, barley, and triticale.

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[1] Prairie Feed Resource Centre, University of Saskatchewan

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wheat Diet	Huliess Diet @ $10/mt discount	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values:	Wheat Diet	Hulless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
	5 Year Average Feed Cost		
Feed: Average Feed Costs			
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	184,394	177,990	$0.46
Finisher Diets	309,485	298,635	$0.78
Total Feed	823,679	801,144	$1.62
	59.08		

	Wheat Diet	Hulless Diet @ $10/mt discount	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount
Operating Interest	24,197	23,797
Total Operating	1,388,403	1,365,468
Total Costs	2,108,920	2,085,985
	5 Year Average Feed Cost	
Gross Margin	736,150	759,085
Net Earnings	15,634	38,569
EBITDA	587,833	610,768
ROA	0.31%	0.77%
EBITDA/Sales	27.67%	28.75%
Net Earnings per Hog	$1.12	$2.77

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.65

ENTERPRISE RETURNS MODULE (6 Phas)

	Wheat Diet	Huliess Diet @ $10/mt discount	Difference
Revenues:			
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

	Wheat Diet	Huliess Diet @ $10/mt discount	
Capital Asset Values:			
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisner Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wheat Diet	Huliess Diet @ $10/mt discount	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	170,889	164,492	$0.46
Finisher Diets	306,776	297,996	$0.63
Total Feed	807,465	787,006	$1.47
	57.92		

	Wheat Diet	Huliess Diet @ $10/mt discount	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost

Size of Operations (Sows)	Wheat Diet	Huliess Diet @ $10/mt discount
Operating Interest	23,909	23,546
Total Operating	1,371,902	1,351,079
Total Costs	2,092,418	2,071,596
	5 Year Average Feed Cost	
Gross Margin	752,652	773,474
Net Earnings	32,136	52,958
EBITDA	604,335	625,157
ROA	0.64%	1.06%
EBITDA/Sales	28.45%	29.43%
Net Earnings per Hog	$2.30	$3.80
Hog pool price/ckg	$140.00	$140.00

Difference $1.49

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wheat Diet	Hulless Diet @ $10/mt discount	Difference
Market Hogs	2,063,895	2,063,895	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values:	Wheat Diet	Hulless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	184,394	177,990	$0.46
Finisher Diets	309,485	298,635	$0.78
Total Feed	823,679	801,144	$1.62
	59.08		

Misc. Costs:	Wheat Diet	Hulless Diet @ $10/mt discount	
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
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Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00

Labour:	82,883	82,883	$0.00

Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount
Operating Interest	24,157	23,797
Total Operating	1,388,403	1,365,468
Total Costs	2,108,920	2,085,985
	5 Year Average Feed Cost	
Gross Margin	736,150	759,085
Net Earnings	15,634	38,568
EBITDA	587,833	610,768
ROA	0.31%	0.77%
EBITDA/Sales	27.67%	28.75%
Net Earnings per Hog	[illegible]	[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference [illegible]

ENTERPRISE RETURNS MODULE (6 Phas)

Revenues	Wheat Diet	Hulless Diet @ $10/mt discount	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values	Wheat Diet	Hulless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nursery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	170,889	164,492	$0.48
Finisher Diets	306,776	297,996	$0.63
Total Feed	807,465	787,006	$1.47
	57.92		

Misc. Costs	Wheat Diet	Hulless Diet @ $10/mt discount	
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00

Fixed Costs			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount
Operating Interest	23,909	23,546
Total Operating	1,371,902	1,351,079
Total Costs	2,092,418	2,071,594
	5 Year Average Feed Cost	
Gross Margin	752,652	773,474
Net Earnings	32,136	52,958
EBITDA	604,335	625,157
ROA	0.64%	1.06%
EBITDA/Sales	28.45%	29.43%
Net Earnings per hog	$2.3	$3.8

Hog pool price/ckg	$140.5	$140.0
	Difference	$1.4

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wheat Diet	Hulless Diet @ $10/mt discount	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00
Capital Asset Values:	Wheat Diet	Hulless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	166,763	160,391	$0.46
Finisher Diets	306,051	297,898	$0.58
Total Feed	802,614	782,808	$1.42
	57.57		
	Wheat Diet	Hulless Diet @ $10/mt discount	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount
Operating Interest	23,823	23,472
Total Operating	1,366,964	1,346,807
Total Costs	2,087,481	2,067,324
	5 Year Average Feed Cost	
Gross Margin	757,589	777,746
Net Earnings	37,073	57,230
EBITDA	609,272	629,429
ROA	0.74%	1.14%
EBITDA/Sales	28.68%	29.63%
Net Earnings per Hog	$2.66	$4.10

Hog pool price/ckg	$140.00	$140.00
Difference		$1.44

ENTERPRISE RETURNS MODULE (Phas)

Revenues:	Wheat Diet	Hulless Diet @ $10/mt discount	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values:	Wheat Diet	Hulless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	159,421	153,442	$0.43
Finisher Diets	308,613	299,883	$0.63
Total Feed	797,834	777,843	$1.43
	57.23		

	Wheat Diet	Hulless Diet @ $10/mt discount	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00

Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount
Operating Interest	23,738	23,384
Total Operating	1,362,100	1,341,754
Total Costs	2,082,616	2,062,271
	5 Year Average Feed Cost	
Gross Margin	762,454	782,799
Net Earnings	41,937	62,283
EBITDA	614,137	634,482
ROA	0.84%	1.24%
EBITDA/Sales	28.91%	29.86%
Net Earnings per Hog	$3.01	$4.47

Hog pool price/ckg	$140.00	$140.00
	Difference	$1.4

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Wheat Diet	Hulless Diet @ $10/mt discount	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00

Capital Asset Values	Wheat Diet	Hulless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nursery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	166,763	160,391	$0.46
Finisher Diets	306,051	297,898	$0.58
Total Feed	802,614	782,808	$1.42
	57.57		

	Wheat Diet	Hulless Diet @ $10/mt discount	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount
Operating Interest	23,823	23,472
Total Operating	1,366,964	1,346,807
Total Costs	2,087,480	2,067,324
	5 Year Average Feed Cost	
Gross Margin	757,58	777,74
Net Earnings	37,07	57,23
EBITDA	609,27	629,42
ROA	0.74%	1.14%
EBITDA/Sales	29.68%	29.63%
Net Earnings per Hog	$2.5	$4.1

Hog pool price/ckg	$140.00	$140.00

Difference $1.4

ENTERPRISE RETURNS MODULE (Phas)

Revenues	Wheat Diet	Huless Diet @ $10/mt discount	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00

Capital Asset Values	Wheat Diet	Huless Diet @ $10/mt discount	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00

Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	129,014	$0.14
Nursery Diets	198,861	195,504	$0.24
Grower Diets	159,421	153,442	$0.43
Finisher Diets	308,613	299,883	$0.63
Total Feed	797,834	777,843	$1.43
	57.23		

	Wheat Diet	Hulless Diet @ $10/mt discount	
Misc. Costs			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Wheat Diet	Hulless Diet @ $10/mt discount
Operating Interest	23,738	23,384
Total Operating	1,362,100	1,341,754
Total Costs	2,082,616	2,062,271
		5 Year Average Feed Cost
Gross Margin	762,454	782,799
Net Earnings	41,937	62,283
EBITDA	614,137	634,482
ROA	0.84%	1.24%
EBITDA/Sales	28.91%	29.86%
Net Earnings per Hog	$3.01	$4.47

Hog pool price/ckg	$140.00	$140.00

Difference $1.4[illegible]

■ Appendix IV – Enterprise Returns Module for Different Facility Sizes

ENTERPRISE RETURNS MODULE (00 Sow Farrow-to-Finish)

Revenues:	Default	Research Project	Difference
Market Hogs	1,031,949	1,031,949	$0.00
Weaners/weanlings			$0.00
Cull Sows	24,787	24,787	$0.00
Cull Boars	560	560	$0.00
Manure Sales	5,369	5,369	$0.00
			$0.00
Total Revenues	1,062,665	1,062,665	$0.00

Capital Asset Values:	Default	Research Project	
Farrowing Facilities	911,035	911,035	$0.00
Nuresery Facilities	414,672	414,672	$0.00
Grower Facilities	470,705	470,705	$0.00
Finisher Facilities	637,965	637,965	$0.00
Sows	122,000	122,000	$0.00
Boars	18,400	18,400	$0.00
Total Value of Assets	2,574,777	2,574,777	$0.00

Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	67,075	67,075	$0.00
Nursery Diets	99,430	99,430	$0.00
Grower Diets	85,445	85,445	$0.00
Finisher Diets	153,388	153,388	$0.00
Total Feed	405,338	405,338	$0.00

	Default	Research Project	
Misc. Costs:			
Replacement Gilts	52,460	52,460	$0.00
Replacement Boars	9,200	9,200	$0.00
Veterinary, Medicine & Supplies	17,427	17,427	$0.00
Maintenenace & Repairs	25,235	25,235	$0.00
Utilities	44,473	44,473	$0.00
Office Supplies	1,743	1,743	$0.00
Marketing & Transportation	34,855	34,855	$0.00
AI Supplies	3,137	3,137	$0.00
Barn Supplies	10,456	10,456	$0.00
Management and Consulting Fees	11,014	11,014	$0.00
Other Misc Costs	349	349	$0.00
Total Misc & Supplies	210,349	210,349	$0.00
Labour:	41,441	41,441	$0.00
Manure Handling	15,945	15,945	$0.00
Water Consumption	8,910	8,910	$0.00
Water and Manure Handling:	24,855	24,855	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	108,367	108,367	$0.00
Interest and Deprec: Nursery	47,678	47,678	$0.00
Interest and Deprec: Grower	54,295	54,295	$0.00
Interest and Deprec: Finisher	73,479	73,479	$0.00
Management Salaries	59,202	59,202	$0.00
Insurance	27,421	27,421	$0.00
Property tax	8,017	8,017	$0.00
Total Fixed Costs	378,460	378,460	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Default	Research Project
Operating Interest	12,096	12,096
Total Operating	694,079	694,079
Total Costs	1,072,539	1,072,539
	5 Year Average Feed Cost	
Gross Margin	368,586	368,586
Net Earnings	(9,873)	(9,873)
EBITDA	281,963	281,963
ROA	-0.38%	-0.38%
EBITDA/Sales	26.53%	26.53%
Net Earnings per Hog	($1.42)	($1.42)

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.00

ENTERPRISE RETURNS MODULE (00 Sow Farrow-to-Finish)

Revenues:	Default	Research Project	Difference
Market Hogs	1,031,949	1,031,949	$0.00
Weaners/weanlings			$0.00
Cull Sows	24,787	24,787	$0.00
Cull Boars	560	560	$0.00
Manure Sales	5,369	5,369	$0.00
			$0.00
Total Revenues	**1,062,665**	**1,062,665**	$0.00

Capital Asset Values	Default	Research Project	
Farrowing Facilities	911,035	911,035	$0.00
Nureserv Facilities	414,672	414,672	$0.00
Grower Facilities	470,705	470,705	$0.00
Finisher Facilities	637,965	637,965	$0.00
Sows	122,000	122,000	$0.00
Boars	18,400	18,400	$0.00
Total Value of Assets	**2,574,777**	**2,574,777**	$0.00

Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	67,075	67,075	$0.00
Nursery Diets	99,430	99,430	$0.00
Grower Diets	85,445	85,445	$0.00
Finisher Diets	153,388	153,388	$0.00
Total Feed	405,338	405,338	$0.00

	Default	Research Project	
Misc. Costs			
Replacement Gilts	52,460	52,460	$0.00
Replacement Boars	9,200	9,200	$0.00
Veterinary, Medicine & Supplies	17,427	17,427	$0.00
Maintenenace & Repairs	25,235	25,235	$0.00
Utilities	44,473	44,473	$0.00
Office Supplies	1,743	1,743	$0.00
Marketing & Transportation	34,855	34,855	$0.00
AI Supplies	3,137	3,137	$0.00
Barn Supplies	10,456	10,456	$0.00
Management and Consulting Fees	11,014	11,014	$0.00
Other Misc Costs	349	349	$0.00
Total Misc & Supplies	**210,349**	**210,349**	$0.00
Labour:	**41,441**	**41,441**	$0.00
Manure Handling	15,945	15,945	$0.00
Water Consumption	8,910	8,910	$0.00
Water and Manure Handling:	**24,855**	**24,855**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	108,367	108,367	$0.00
Interest and Deprec: Nursery	47,678	47,678	$0.00
Interest and Deprec: Grower	54,295	54,295	$0.00
Interest and Deprec: Finisher	73,479	73,479	$0.00
Management Salaries	59,202	59,202	$0.00
Insurance	27,421	27,421	$0.00
Property tax	8,017	8,017	$0.00
Total Fixed Costs	**378,460**	**378,460**	**$0.00**

5 Year Average Feed Cost		
Size of Operations (Sows	Default	Research Project
Operating Interest	12,096	12,096
Total Operating	694,079	694,079
Total Costs	1,072,539	1,072,539
	5 Year Average Feed Cost	
Gross Margin	368,586	368,586
Net Earnings	(9,873)	(9,873)
EBITDA	281,963	281,963
ROA	-0.38%	-0.38%
EBITDA/Sales	26.53%	26.53%
Net Earnings per Hog	($1.42)	($1.42)

Hog pool price/ckg	$140.00	$140.00

Difference $0.00

ENTERPRISE RETURNS MODULE (600 Sow Farrow-to-Finish)

Revenues	Default	Research Project	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	**2,124,554**	**2,124,554**	$0.00
Capital Asset Values	Default	Research Project	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	**5,017,006**	**5,017,006**	$0.00
Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	306,776	$0.00
Total Feed	807,465	807,465	$0.00
	57.92		
	Default	Research Project	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	**408,297**	**408,297**	$0.00
Labour:	**82,883**	**82,883**	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	**49,347**	**49,347**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	**720,516**	**720,516**	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Research Project
Operating Interest	23,909	23,909
Total Operating	1,371,902	1,371,902
Total Costs	2,092,418	2,092,418
	5 Year Average Feed Cost	
Gross Margin	752,652	752,652
Net Earnings	32,136	32,136
EBITDA	604,335	604,335
ROA	0.64%	0.64%
EBITDA/Sales	28.45%	28.45%
Net Earnings per Hog	$2.30	$2.30

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.00

ENTERPRISE RETURNS MODULE (00 Sow Farrow-to-Finish)

Revenues:	Default	Research Project	Difference
Market Hogs	4,127,798	4,127,798	$0.00
Weaners/weanlings			$0.00
Cull Sows	99,149	99,149	$0.00
Cull Boars	420	420	$0.00
Manure Sales	21,273	21,273	$0.00
			$0.00
Total Revenues	**4,248,641**	**4,248,641**	$0.00
Capital Asset Values:	Default	Research Project	
Farrowing Facilities	3,416,158	3,416,158	$0.00
Nuresery Facilities	1,591,088	1,591,088	$0.00
Grower Facilities	1,808,520	1,808,520	$0.00
Finisher Facilities	2,448,116	2,448,116	$0.00
Sows	475,800	475,800	$0.00
Boars	13,455	13,455	$0.00
Total Value of Assets	**9,753,137**	**9,753,137**	$0.00
Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	259,951	259,951	$0.00
Nursery Diets	397,722	397,722	$0.00
Grower Diets	341,778	341,778	$0.00
Finisher Diets	613,552	613,552	$0.00
Total Feed	1,613,004	1,613,004	$0.00
	57.85		
	Default	Research Project	
Misc. Costs:			
Replacement Gilts	204,594	204,594	$0.00
Replacement Boars	6,728	6,728	$0.00
Veterinary, Medicine & Supplies	69,709	69,709	$0.00
Maintenenace & Repairs	100,939	100,939	$0.00
Utilities	175,194	175,194	$0.00
Office Supplies	6,971	6,971	$0.00
Marketing & Transportation	139,418	139,418	$0.00
AI Supplies	12,548	12,548	$0.00
Barn Supplies	41,825	41,825	$0.00
Management and Consulting Fees	44,056	44,056	$0.00
Other Misc Costs	1,394	1,394	$0.00
Total Misc & Supplies	**803,376**	**803,376**	$0.00
Labour:	**165,766**	**165,766**	$0.00
Manure Handling	63,182	63,182	$0.00
Water Consumption	35,295	35,295	$0.00
Water and Manure Handling:	**98,477**	**98,477**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	408,297	408,297	$0.00
Interest and Deprec: Nursery	183,208	183,208	$0.00
Interest and Deprec: Grower	208,900	208,900	$0.00
Interest and Deprec: Finisher	282,383	282,383	$0.00
Management Salaries	130,244	130,244	$0.00
Insurance	104,584	104,584	$0.00
Property tax	32,066	32,066	$0.00
Total Fixed Costs	**1,349,683**	**1,349,683**	**$0.00**

	5 Year Average Feed Cost	
Size of Operations (Sows)	Default	Research Project
Operating Interest	47,546	47,546
Total Operating	2,728,168	2,728,168
Total Costs	4,077,851	4,077,851
	5 Year Average Feed Cost	
Gross Margin	1,520,473	1,520,473
Net Earnings	170,789	170,789
EBITDA	1,285,644	1,285,644
ROA	1.75%	1.75%
EBITDA/Sales	30.26%	30.26%
Net Earnings per Hog	$6.13	$6.13

Hog pool price/ckg	$140.00	$140.00
Difference	$0.00	

ENTERPRISE RETURNS MODULE (600 Sow Farrow-to-Finish)

Revenues	Default	Research Project	Difference
Market Hogs	2,063,899	2,063,899	$0.00
Weaners/weanlings			$0.00
Cull Sows	49,575	49,575	$0.00
Cull Boars	420	420	$0.00
Manure Sales	10,660	10,660	$0.00
			$0.00
Total Revenues	2,124,554	2,124,554	$0.00
Capital Asset Values	Default	Research Project	
Farrowing Facilities	1,766,885	1,766,885	$0.00
Nuresery Facilities	814,344	814,344	$0.00
Grower Facilities	925,048	925,048	$0.00
Finisher Facilities	1,252,930	1,252,930	$0.00
Sows	244,000	244,000	$0.00
Boars	13,800	13,800	$0.00
Total Value of Assets	5,017,006	5,017,006	$0.00
Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	130,939	130,939	$0.00
Nursery Diets	198,861	198,861	$0.00
Grower Diets	170,889	170,889	$0.00
Finisher Diets	306,776	306,776	$0.00
Total Feed	807,465	807,465	$0.00
	57.92		
	Default	Research Project	
Misc. Costs:			
Replacement Gilts	104,920	104,920	$0.00
Replacement Boars	6,900	6,900	$0.00
Veterinary, Medicine & Supplies	34,855	34,855	$0.00
Maintenenace & Repairs	50,469	50,469	$0.00
Utilities	88,047	88,047	$0.00
Office Supplies	3,485	3,485	$0.00
Marketing & Transportation	69,709	69,709	$0.00
AI Supplies	6,274	6,274	$0.00
Barn Supplies	20,913	20,913	$0.00
Management and Consulting Fees	22,028	22,028	$0.00
Other Misc Costs	697	697	$0.00
Total Misc & Supplies	408,297	408,297	$0.00
Labour:	82,883	82,883	$0.00
Manure Handling	31,660	31,660	$0.00
Water Consumption	17,687	17,687	$0.00
Water and Manure Handling:	49,347	49,347	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	210,955	210,955	$0.00
Interest and Deprec: Nursery	93,785	93,785	$0.00
Interest and Deprec: Grower	106,877	106,877	$0.00
Interest and Deprec: Finisher	144,548	144,548	$0.00
Management Salaries	94,723	94,723	$0.00
Insurance	53,594	53,594	$0.00
Property tax	16,033	16,033	$0.00
Total Fixed Costs	720,516	720,516	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Research Project
Operating Interest	23,909	23,909
Total Operating	1,371,902	1,371,902
Total Costs	2,092,418	2,092,418
	5 Year Average Feed Cost	
Gross Margin	752,652	752,652
Net Earnings	32,136	32,136
EBITDA	604,335	604,335
ROA	0.64%	0.64%
EBITDA/Sales	28.45%	28.45%
Net Earnings per hog	$2.30	$2.30

Hog pool price/ckg	$140.00	$140.00

Difference $0.00

ENTERPRISE RETURNS MODULE (00 Sow Farrow-to-Finish)

Revenues	Default	Research Project	Difference
Market Hogs	4,127,798	4,127,798	$0.00
Weaners/weanlings			$0.00
Cull Sows	99,149	99,149	$0.00
Cull Boars	420	420	$0.00
Manure Sales	21,273	21,273	$0.00
			$0.00
Total Revenues	4,248,641	4,248,641	$0.00

Capital Asset Values	Default	Research Project	
Farrowing Facilities	3,416,158	3,416,158	$0.00
Nuresery Facilities	1,591,088	1,591,088	$0.00
Grower Facilities	1,808,520	1,808,520	$0.00
Finisher Facilities	2,448,116	2,448,116	$0.00
Sows	475,800	475,800	$0.00
Boars	13,455	13,455	$0.00
Total Value of Assets	9,753,137	9,753,137	$0.00

Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	259,951	259,951	$0.00
Nursery Diets	397,722	397,722	$0.00
Grower Diets	341,778	341,778	$0.00
Finisher Diets	613,552	613,552	$0.00
Total Feed	1,613,004	1,613,004	$0.00
	57.85		

	Default	Research Project	
Misc. Costs:			
Replacement Gilts	204,594	204,594	$0.00
Replacement Boars	6,728	6,728	$0.00
Veterinary, Medicine & Supplies	69,709	69,709	$0.00
Maintenenace & Repairs	100,939	100,939	$0.00
Utilities	175,194	175,194	$0.00
Office Supplies	6,971	6,971	$0.00
Marketing & Transportation	139,418	139,418	$0.00
AI Supplies	12,548	12,548	$0.00
Barn Supplies	41,825	41,825	$0.00
Management and Consulting Fees	44,056	44,056	$0.00
Other Misc Costs	1,394	1,394	$0.00
Total Misc & Supplies	803,376	803,376	$0.00
Labour:	165,766	165,766	$0.00
Manure Handling	63,182	63,182	$0.00
Water Consumption	35,295	35,295	$0.00
Water and Manure Handling:	98,477	98,477	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	408,297	408,297	$0.00
Interest and Deprec: Nursery	183,208	183,208	$0.00
Interest and Deprec: Grower	208,900	208,900	$0.00
Interest and Deprec: Finisher	282,383	282,383	$0.00
Management Salaries	130,244	130,244	$0.00
Insurance	104,584	104,584	$0.00
Property tax	32,066	32,066	$0.00
Total Fixed Costs	1,349,683	1,349,683	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Research Project
Operating Interest	47,546	47,546
Total Operating	2,728,168	2,728,168
Total Costs	4,077,851	4,077,851
	5 Year Average Feed Cost	
Gross Margin	1,520,473	1,520,473
Net Earnings	170,789	170,789
EBITDA	1,285,644	1,285,644
ROA	1.75%	1.75%
EBITDA/Sales	30.26%	30.26%
Net Earnings per Hog	$6.1[illegible]	$6.1[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference $0.00

ENTERPRISE RETURNS MODULE (00 Sow Farrow-to-Finish)

Revenues:	Default	Research Project	Difference
Market Hogs	8,255,596	8,255,596	$0.00
Weaners/weanlings			$0.00
Cull Sows	198,299	198,299	$0.00
Cull Boars	420	420	$0.00
Manure Sales	42,500	42,500	$0.00
			$0.00
Total Revenues	8,496,815	8,496,815	$0.00
Capital Asset Values:	Default	Research Project	
Farrowing Facilities	6,648,206	6,648,206	$0.00
Nuresery Facilities	3,121,975	3,121,975	$0.00
Grower Facilities	3,550,252	3,550,252	$0.00
Finisher Facilities	4,803,742	4,803,742	$0.00
Sows	927,200	927,200	$0.00
Boars	13,110	13,110	$0.00
Total Value of Assets	19,064,485	19,064,485	$0.00
Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	517,976	517,976	$0.00
Nursery Diets	795,443	795,443	$0.00
Grower Diets	683,556	683,556	$0.00
Finisher Diets	1,227,105	1,227,105	$0.00
Total Feed	3,224,080	3,224,080	$0.00
	57.81		
	Default	Research Project	
Misc. Costs:			
Replacement Gilts	398,696	398,696	$0.00
Replacement Boars	6,555	6,555	$0.00
Veterinary, Medicine & Supplies	139,418	139,418	$0.00
Maintenenace & Repairs	201,878	201,878	$0.00
Utilities	349,487	349,487	$0.00
Office Supplies	13,942	13,942	$0.00
Marketing & Transportation	278,836	278,836	$0.00
AI Supplies	25,095	25,095	$0.00
Barn Supplies	83,651	83,651	$0.00
Management and Consulting Fees	88,112	88,112	$0.00
Other Misc Costs	2,788	2,788	$0.00
Total Misc & Supplies	1,588,459	1,588,459	$0.00
Labour:	331,531	331,531	$0.00
Manure Handling	126,226	126,226	$0.00
Water Consumption	70,511	70,511	$0.00
Water and Manure Handling:	196,738	196,738	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	794,722	794,722	$0.00
Interest and Deprec: Nursery	359,261	359,261	$0.00
Interest and Deprec: Grower	409,806	409,806	$0.00
Interest and Deprec: Finisher	553,747	553,747	$0.00
Management Salaries	201,287	201,287	$0.00
Insurance	205,079	205,079	$0.00
Property tax	64,132	64,132	$0.00
Total Fixed Costs	2,588,035	2,588,035	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Research Project
Operating Interest	94,729	94,729
Total Operating	5,435,538	5,435,538
Total Costs	8,023,572	8,023,572
	5 Year Average Feed Cost	
Gross Margin	3,061,277	3,061,277
Net Earnings	473,243	473,243
EBITDA	2,654,911	2,654,911
ROA	2.48%	2.48%
EBITDA/Sales	31.25%	31.25%
Net Earnings per Hog	$8.49	$8.49

Hog pool price/ckg	$140.00	$140.00
	Difference	$0.00

ENTERPRISE RETURNS MODULE (000 Sow Farrow-to-Finish)

Revenues:	Default	Research Project	Difference
Market Hogs	16,511,191	16,511,191	$0.00
Weaners/weanlings			$0.00
Cull Sows	396,598	396,598	$0.00
Cull Boars	420	420	$0.00
Manure Sales	84,954	84,954	$0.00
			$0.00
Total Revenues	**16,993,163**	**16,993,163**	$0.00
Capital Asset Values:	Default	Research Project	
Farrowing Facilities	12,979,301	12,979,301	$0.00
Nureserv Facilities	6,138,550	6,138,550	$0.00
Grower Facilities	6,983,287	6,983,287	$0.00
Finisher Facilities	9,445,506	9,445,506	$0.00
Sows	1,805,600	1,805,600	$0.00
Boars	12,765	12,765	$0.00
Total Value of Assets	**37,365,009**	**37,365,009**	$0.00
Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	1,034,025	1,034,025	$0.00
Nursery Diets	1,590,887	1,590,887	$0.00
Grower Diets	1,367,113	1,367,113	$0.00
Finisher Diets	2,454,209	2,454,209	$0.00
Total Feed	6,446,234	6,446,234	$0.00
	57.80		
	Default	Research Project	
Misc. Costs:			
Replacement Gilts	776,408	776,408	$0.00
Replacement Boars	6,383	6,383	$0.00
Veterinary, Medicine & Supplies	278,836	278,836	$0.00
Maintenenace & Repairs	403,755	403,755	$0.00
Utilities	698,074	698,074	$0.00
Office Supplies	27,884	27,884	$0.00
Marketing & Transportation	557,673	557,673	$0.00
AI Supplies	50,191	50,191	$0.00
Barn Supplies	167,302	167,302	$0.00
Management and Consulting Fees	176,225	176,225	$0.00
Other Misc Costs	5,577	5,577	$0.00
Total Misc & Supplies	**3,148,307**	**3,148,307**	$0.00
Labour:	**663,062**	**663,062**	$0.00
Manure Handling	252,314	252,314	$0.00
Water Consumption	140,943	140,943	$0.00
Water and Manure Handling:	**393,258**	**393,258**	$0.00
Fixed Costs:			
Interest and Deprec: Farrowing	1,551,051	1,551,051	$0.00
Interest and Deprec: Nursery	705,785	705,785	$0.00
Interest and Deprec: Grower	805,336	805,336	$0.00
Interest and Deprec: Finisher	1,087,864	1,087,864	$0.00
Management Salaries	343,372	343,372	$0.00
Insurance	403,095	403,095	$0.00
Property tax	128,265	128,265	$0.00
Total Fixed Costs	**5,024,768**	**5,024,768**	$0.00

	5 Year Average Feed Cost	
Size of Operations (Sows)	Default	Research Project
Operating Interest	188,913	188,913
Total Operating	10,839,774	10,839,774
Total Costs	15,864,542	15,864,542
	5 Year Average Feed Cost	
Gross Margin	6,153,389	6,153,389
Net Earnings	1,128,621	1,128,621
EBITDA	5,406,923	5,406,923
ROA	3.02%	3.02%
EBITDA/Sales	31.82%	31.82%
Net Earnings per Hog	$10.12	$10.12

Hog pool price/ckg	$140.00	$140.00
Difference		$0.00

ENTERPRISE RETURNS MODULE (00 Sow Farrow-to-Finish)

Revenues	Default	Research Project	Difference
Market Hogs	8,255,596	8,255,596	$0.00
Weaners/weanlings			$0.00
Cull Sows	198,299	198,299	$0.00
Cull Boars	420	420	$0.00
Manure Sales	42,500	42,500	$0.00
			$0.00
Total Revenues	8,496,815	8,496,815	$0.00

Capital Asset Values	Default	Research Project	
Farrowing Facilities	6,648,206	6,648,206	$0.00
Nuresery Facilities	3,121,975	3,121,975	$0.00
Grower Facilities	3,550,252	3,550,252	$0.00
Finisher Facilities	4,803,742	4,803,742	$0.00
Sows	927,200	927,200	$0.00
Boars	13,110	13,110	$0.00
Total Value of Assets	19,064,485	19,064,485	$0.00

Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	517,976	517,976	$0.00
Nursery Diets	795,443	795,443	$0.00
Grower Diets	683,556	683,556	$0.00
Finisher Diets	1,227,105	1,227,105	$0.00
Total Feed	3,224,080	3,224,080	$0.00
	57.81		

	Default	Research Project	
Misc. Costs			
Replacement Gilts	398,696	398,696	$0.00
Replacement Boars	6,555	6,555	$0.00
Veterinary, Medicine & Supplies	139,418	139,418	$0.00
Maintenenace & Repairs	201,878	201,878	$0.00
Utilities	349,487	349,487	$0.00
Office Supplies	13,942	13,942	$0.00
Marketing & Transportation	278,836	278,836	$0.00
AI Supplies	25,095	25,095	$0.00
Barn Supplies	83,651	83,651	$0.00
Management and Consulting Fees	88,112	88,112	$0.00
Other Misc Costs	2,788	2,788	$0.00
Total Misc & Supplies	1,588,459	1,588,459	$0.00

Labour:	331,531	331,531	$0.00

Manure Handling	126,226	126,226	$0.00
Water Consumption	70,511	70,511	$0.00
Water and Manure Handling:	196,738	196,738	$0.00

Fixed Costs			
Interest and Deprec. Farrowing	794,722	794,722	$0.00
Interest and Deprec. Nursery	359,261	359,261	$0.00
Interest and Deprec. Grower	409,806	409,806	$0.00
Interest and Deprec. Finisher	553,747	553,747	$0.00
Management Salaries	201,287	201,287	$0.00
Insurance	205,079	205,079	$0.00
Property tax	64,132	64,132	$0.00
Total Fixed Costs	2,588,035	2,588,035	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows	Default	Research Project
Operating Interest	94,729	94,729
Total Operating	5,435,538	5,435,538
Total Costs	8,023,573	8,023,573
	5 Year Average Feed Cost	
Gross Margin	3,061,277	3,061,277
Net Earnings	473,242	473,242
EBITDA	2,654,911	2,654,911
ROA	2.48%	2.48%
EBITDA/Sales	31.25%	31.25%
Net Earnings per hog	$8.4	$8.4

Hog pool price/ckg	$140.00	$140.00
Difference		$0.00

ENTERPRISE RETURNS MODULE (000 Sow Farrow-to-Finish)

Revenues	Default	Research Project	Difference
Market Hogs	16,511,191	16,511,191	$0.00
			$0.00
Weaners(weaning)			
Cull Sows	396,598	396,598	$0.00
Cull Boars	420	420	$0.00
Manure Sales	84,954	84,954	$0.00
			$0.00
Total Revenues	16,993,163	16,993,163	$0.00

Capital Asset Values	Default	Research Project	
Farrowing Facilities	12,979,301	12,979,301	$0.00
Nuresery Facilities	6,138,550	6,138,550	$0.00
Grower Facilities	6,983,287	6,983,287	$0.00
Finisher Facilities	9,445,506	9,445,506	$0.00
Sows	1,805,600	1,805,600	$0.00
Boars	12,765	12,765	$0.00
Total Value of Assets	37,365,009	37,365,009	$0.00

Size of Operations (Sows)	Default	Research Project	
Feed: Average Feed Costs	5 Year Average Feed Cost		
Sow and Boar Diets	1,034,025	1,034,025	$0.00
Nursery Diets	1,590,887	1,590,887	$0.00
Grower Diets	1,367,113	1,367,113	$0.00
Finisher Diets	2,454,209	2,454,209	$0.00
Total Feed	6,446,234	6,446,234	$0.00
	57.80		

	Default	Research Project	
Misc. Costs			
Replacement Gilts	776,408	776,408	$0.00
Replacement Boars	6,383	6,383	$0.00
Veterinary, Medicine & Supplies	278,836	278,836	$0.00
Maintenenace & Repairs	403,755	403,755	$0.00
Utilities	698,074	698,074	$0.00
Office Supplies	27,884	27,884	$0.00
Marketing & Transportation	557,673	557,673	$0.00
AI Supplies	50,191	50,191	$0.00
Barn Supplies	167,302	167,302	$0.00
Management and Consulting Fees	176,225	176,225	$0.00
Other Misc Costs	5,577	5,577	$0.00
Total Misc & Supplies	3,148,307	3,148,307	$0.00
Labour:	663,062	663,062	$0.00
Manure Handling	252,314	252,314	$0.00
Water Consumption	140,943	140,943	$0.00
Water and Manure Handling:	393,258	393,258	$0.00
Fixed Costs			
Interest and Deprec: Farrowing	1,551,051	1,551,051	$0.00
Interest and Deprec: Nursery	705,785	705,785	$0.00
Interest and Deprec: Grower	805,336	805,336	$0.00
Interest and Deprec: Finisher	1,087,864	1,087,864	$0.00
Management Salaries	343,372	343,372	$0.00
Insurance	403,095	403,095	$0.00
Property tax	128,265	128,265	$0.00
Total Fixed Costs	5,024,768	5,024,768	$0.00

5 Year Average Feed Cost		
Size of Operations (Sows)	Default	Research Project
Operating Interest	188,913	188,913
Total Operating	10,839,774	10,839,774
Total Costs	15,864,542	15,864,542
	5 Year Average Feed Cost	
Gross Margin	6,153,384	6,153,384
Net Earnings	1,128,621	1,128,621
EBITDA	5,406,921	5,406,921
ROA	3.02%	3.02%
EBITDA/Sales	31.82%	31.82%
Net Earnings per hog	$10.[illegible]	$[illegible]

Hog pool price/ckg	$140.00	$140.00

Difference: $[illegible]